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OFFICE AUTOMATION

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OA

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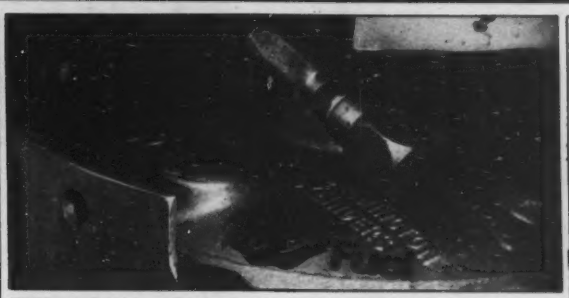

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EDITORIAL

It appears that both users and vendors may be approaching burnout when it comes to computer shows. Over the last few years, the number and type of computer conferences and exhibitions has increased dramatically, causing problems for users and vendors alike. Although a number of new shows have started up in the last year or two, attendance has been unspectacular, and even the larger and more established shows are drawing smaller crowds.

Giants like AT&T, IBM and Digital Equipment Corp. continue to pull in large groups, but even they have to choose carefully the shows at which they will appear. They're caught in the trap of appearing for appearance's sake. If they don't exhibit at a certain show, will the industry think they are soft in the market? Or having financial problems?

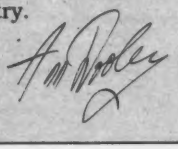
The situation is even more difficult for smaller companies. What's in it for them? Exhibiting at shows is a costly undertaking. For a start-up company, exhibiting at one trade show can sometimes amount to a make or break situation because of the resources — in money, time and people — it must invest in order to exhibit. When the customers don't show up, it can be a catastrophe.

One company, tired of the conference show treadmill, recently decided to stop exhibiting at all but one or two shows. " We woke up one day and realized we were spending too much time and resources exhibiting at shows that all too often had very small returns. We had to decide whether we were in the show business or the computer business; we decided on the latter," a spokesman said.

The decision of which trade show or shows to exhibit at can be a gut-wrenching decision and is no longer foolproof by any means. July's National Computer Conference (NCC) is a perfect example. Long the show case for the computer industry, NCC was woefully short on attendees; even some of its long-time exhibitors decided not to appear. Whether because of the location (Vegas), the time (midsummer) or some other yet-to-be-determined reason, NCC attendance was down to an estimated 60,000 from the previous year's estimated 90,000.

What is keeping users from these shows? Are they tired of the same old sessions? Should 1984 be chalked up as just one of those years? The answers are still unknown, but one interesting sidelight should be noted. As the attendance at conferences and exhibits declines, user group meetings seem to be attracting more people than ever before.

The industry should not let these events slide by. If the trend continues, in order to regain attendance at their shows, conference managers will need to examine why and how users' needs are changing. This is essential, not just for the good of the managers' own financial pocketbooks, but for the well-being of the entire industry.



LETTERS

LESSONS FROM THE PAST

Office automation (OA) applied to business, government and so on is repeating history and spending a lot of money doing it. We haven't learned from past mistakes!

True, technologically we are more sophisticated and accelerated, but this is reason for all the more caution. Or, the paradox of marketing: sell today and make your million, vs. buy today and go broke tomorrow.

When I read about all the concerns today in OA — network compatibility, software and hardware alike — I can only think of all those business decisions being made, from the biggest to the smallest — and the short term and long term of them all.

Take programming in Cobol, for example; 20 years ago, structured/modular top-down design and developement was learned only after 30 years into the industry. How much time and money was spent in the first 30 years?

Take master file concept; everybody and his brother had address files. Data bases eliminated the related redundancy and maintenance problems. Only after 20 years of processing did we learn this. Again, how much time and money was spent?

Now we have large shared data bases, networks, common modules, mainframes and worse — office automation.

Or, maybe, better. OA is definately the wave of the future, but let's evaluate our past mistakes or historical trends and learn from them.

Let's not wait 20 years to do it! We should all be concerned.

Rich Vasquez
Programmer
County Administrative Office
San Bernardino, Calif.

USER SUPPORT NEEDS

Your article, "Service and Support" for OA users [CW OA, June 6] did an excellent job of identifying critical user support needs.

May I add one more? Users also need a new methodology for determining system design requirements. The old-fashioned multistep methods that emphasize heavy documentation requirements just won't do when you're trying to create a departmental travel tracking system or a correspondence ledger using Dbase II on your IBM PC.

Users need an interactive approach that emphasizes their direct participation in the design process. And OA application designers need an approach that cuts design time and documentation requirements.

Without this new methodology, we are in danger of re-creating the user frustration and application backlogs that characterized the relationship between mainframe users and MIS groups.

Naomi Leventhal, Ph.D.
Vice-President
Performance Resources, Inc.
Alexandria, Va.

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FOCUS

By Thomas R. McColl And Karen Rancourt

How real is the alleged information explosion? Are business people really drowning in information? If so, what are the implications for decision makers?

A few years ago, business people feared they were making decisions based on too little information. Today, many are apprehensive about the quality and validity of decisions because they feel inundated with information.

True, the creation and distribution of information is a relatively recent phenomenon. For example, a learned man in the 17th-century would be exposed — in his entire lifetime — to an amount of information equivalent to that contained in one edition of the *Wall Street Journal.*

According to some estimates, 90% of all the information ever put in printed form has been generated since 1900, and 87% of this information has been generated since 1950. The amount of existing information doubles every seven to 10 years. In the U.S. alone, 37,000 new books are published every year. This is an enormous amount of information. We have, in fact, been subjected to an information explosion of sorts. Will it leave us out of control?

Only if we believe we must know all there is to know. As long as decision makers believe they must have at their fingertips all the available information on any one topic or issue, they will either become mired in the information-gathering stage because they feel compelled to get all existing information — an impossibility — or they will never get around to making a decision. Something "new" might come to light, as it always does if we wait long enough.

So what's a decision maker to do? Apply four basic principles:

- **Accept reality.** No one can ever have access to all available information on any topic or issue.
- **Let technology do its thing.** Let it store, sort and retrieve data and information.
- **Byte the bullet and make a decision.** Take your data and information, apply your experience, intuition and common sense and make your decision.
- **Be prepared to revisit periodically the first two of these principles.**

Why don't more decision makers follow these principles? Many, consciously or unconsciously, avoid making decisions because they "need more information." If a decision maker can define specific data or information required to make a decision and can justify the importance of this information, chances are the continued search is warranted. However, if a decision maker takes the position that information gathering needs to continue "just in case we've missed something," it could indicate this is an excuse to avoid making a decision.

The second principle suggests an even more important reason of how and why information can be misused. Very few business people accept the recently bantered about maxim that "Real managers don't use computers." A recent Lou Harris poll suggests the opposite: 91% of the managers surveyed believe a computer would make them more productive. Also, 84% believed the computer would increase the number and variety of their responsibilities.

When this same sample was asked how many had actually had any computer training, 55% said they had never had any. In fact, fewer than 6% of managers, professionals, administrators and executives in the U.S. actually use computers.

This is the discrepancy that can hinder effective and timely decision making. Vast amounts of information are available, and technology continues to advance at mind-boggling rates. Information begets information: There is no reason to think the information explosion will abate; if anything, it will increase.

Will business people drown in this information? Only if they choose to. Of the mounds of information that typically come across a desk, studies show that only 5% to 10% is worth saving. Decision makers must become less "pack-ratty" and pass on or throw out much of what they receive.

If decision makers are not only to survive but also to thrive, they must be willing to use the technology that can help them store, sort and retrieve information. This might mean they build their own data bases or it might mean accessing existing data bases. In either case, it means making use of the available, computerized means of managing information.

However, human intervention is still required to decide what information is worth saving and what is not. One executive remarked to a computer vendor, "You know what your corporation has done to us? You've sold us millions and millions of dollars of technology. And do you know what we have here? We have hundreds and hundreds of filing cabinets. And what do they contain? Diskettes! And nobody knows what is on them, and nobody will even look at them again."

There is a lesson here. The real challenge is for decision makers to know what information is important, usable and worth saving. When those questions have been answered, technology can be a valuable tool to streamline and expedite decision making. OA

Rancourt works for Banyon Systems, Inc. in Westboro, Mass., and McColl works for another Massachusetts high technology company.

Q&A

E. Gerald Hurst, Jr., is the founder and president of the Software and Technology Development Corp. in Wallingford, Pa.

Hurst is also an associate professor of decision sciences at the Wharton School of the University of Pennsylvania. He talked to Computerworld OA *recently about the current status and future directions of decision support systems (DSS).*

How do office automation and DSS interrelate?

If you look at the functions of transforming data into information, that information creates a decision, and decision support is the tool that does that.

You start looking at office automation as data, as text. It's multimedia communications; it's a manager, assistant and the machine, communicating with the outside world. It's a productivity tool for that team.

Then it becomes clear that the things being processed go beyond letters and communication. It really is a matter of processing the mix of information, both quantitative and qualititative.

In that view, it's very much a decision support function. DSS predate office automation, but now the whole idea of OA and the workstation make decision support systems one of the functions of OA.

What is the state of DSS software relating to OA?

It's almost like selecting from a Chinese menu. You ought to have some sort of financial planning tool, some sort of data management capability, either locally or at some host system and, presumably, some dialogue management. One of the hot buttons is windows.

What's good? Lotus 1-2-3 is popular and deservedly so. Who knows what else will be along, either from Lotus or from someone else.

But right now it really is a Chinese menu selection.

What about the impact of the personal computer on DSS?

The personal computer has been an enabling mechanism and will continue to be that. It has brought DSS from the domain of the rich few to the domain of the many.

The large computer, full support staff and expensive DSS generator software has been replaced by a dedicated, single-function unit on the desk — and it's very affordable. Starting with the advent of Apple and Visicalc, a marketing manager could do his sales projections without depending on anyone else; that's decision support.

Has the interest in DSS peaked?

Interest in DSS will continue to grow, but it will be so imbedded in the system that we won't even notice it.

It will be almost in the sense that we've been speaking prose all our lives and didn't realize it, and now we have a better way of speaking prose. We've been doing decision support and now we have a more finely honed tool for doing it.

But for most managers, it's so much a part of what they do for a living that it'll be adopted and included without much fanfare.

Do you think DSS will help bring OA to the executive/manager level?

Yes. There are cases of managers who've had the terminal wheeled in and after a week had it wheeled back out again because they felt all it could do was look up people's schedules and type letters.

The thing that makes it a managerial workstation is decision support information.

Information on command, but more important, projection on command as well. The first generation of OA may have worried about support staff efficiency. We're moving into an era of worrying about managerial effectiveness, and that's where decision support will come into its own in the OA environment.

What about the role of the management information systems (MIS) person in DSS development?

The MIS function will obviously be important. In addition to maintaining the corporate data, which is a very essential part of DSS, MIS will probably maintain the support functions for all the technology, the learning, the training and so on. They simply won't have the direct intervention and control of the application that has moved close to or to the ultimate user.

What is the future of personal computer-based DSS?

It doesn't take any great seer to predict that there will be even more dissemination, more and different people involved in terms of organization, job description and so forth.

Beyond that, I see integration, which is what OA is all about — integration of more functions with a simple interface.

Second, artificial intelligence or expert systems will come into play. DSS will be less passive as it actively proposes alternatives, suggests solutions, makes simple decisions based on your recommendations or gives a range of options. In short, as we learn more about it, the evolutionary nature of DSS is such that we will give more responsibility to the system. OA

OA NEWS

NCC 84: SLOWING DOWN?

LAS VEGAS — The American Federation of Information Processing Societies, Inc. (Afips) wasn't giving out numbers, but the Las Vegas cabbies — who should know something about numbers — estimated the crowd at this year's National Computer Conference (NCC) at less than 70,000.

Given the fact that Las Vegas in July doesn't hold quite the same appeal as, say, Honolulu in February, Afips and a majority of the 702 exhibitors may have been pleased to see anyone at all. Though the numbers were clearly down from past conferences, Afips pointed out that those attending were "quality" visitors (serious potential customers). More cynical analysts insisted that, excluding exhibitors and members of media, there were few buyers at all. Without an effective way to measure hard-dollar and soft-dollar impact, the value of being present at NCC remained up to conjecture.

Though the temperatures outside the Las Vegas Convention Center stayed neck and neck with IBM stock prices throughout the week, the activities inside went off with nary a hitch. Afips went all out to ensure that exhibitors and attendees remained cool and comfortable. The organization deserved high marks for the smooth handling of what has become an almost unmanageable event. No major catastrophes — either people or machine — occurred, and Afips and Convention Center personnel were stationed at virtually every corner to answer questions and handle emergencies.

The conference itself, in fact, turned out to be a rather ho-hum affair, according to most observers. There were few product announcements, and none of any great significance. Prime Computer, in fact, not only chose to stay away from NCC, but announced a pair of superminicomputers that week to boot (story, Page 53).

A group of 16 organizations, including many of the industry's major vendors, participated in a demonstration of a local-area network using high-level protocol standards. Sponsored by the National Bureau of Standards, General Motors Corp. and Boeing Computer Services, the demonstration was of the interaction of varied information systems, using the International Standards Organization's (ISO) transport protocol — one level of the ISO's seven-layer Open Systems Interconnection model.

John F. Akers, president of IBM, delivered the keynote speech. He pointed out that those in the computer industry have three major responsibilities: to customers and users of the products, to the industry itself and to society at large.

Akers managed to raise the hackles of many members of the attending press by intimating that the media, more than the vendors themselves, have created an image of the competitive battlefield. "We need press and public to understand that in this industry, this morning's competitor may be this afternoon's customer and this evening's partner in some joint venture, not gladiators in mortal combat," Akers said.

The vendors, fiercely competitive and otherwise, along with the rest of the multitudes who have expressed disappointment over NCC, will nevertheless gather next July 15-18 at McCormick Place in Chicago to do it all again.

AS HP TURNS

PALO ALTO, Calif. — For the fourth time since 1970, Hewlett-Packard Co. has experienced a major restructuring. The Palo Alto-Calif.-based precision electronic equipment and computer giant, in an effort to "bring its product groups and field marketing activities more closely in line with the major markets they serve" has been broken into four major sectors.

HP also created a new position, chief operating officer, and promoted executive vice-president Dean O. Morton to fill it. Morton will work with HP's president John A. Young.

HP's four new sectors are the following:

- Measurement, design and manufacturing systems — comprised of electronic instruments, microwave and communication products, manufacturing systems, and computer-aided design and engineering products.
- Information systems and networks — including business computer systems, personal computation products and computer peripherals and networks.
- Analytical, components, medical and technology — consisting of analytical instrumentation, electronic components and medical electronic instruments and systems. This group also includes HP Laboratories, the company's central research and development unit.
- Marketing and international — encompasses worldwide sales and sales administration activities and other corporate-level marketing activities.

The overhaul repositions HP's many product divisions into groups focused on markets rather than products.

Although there has been speculation that the reorganization will signal a change in the top leadership at HP, a company spokesman insisted that David Packard, the 70-year-old cofounder of HP, intends to remain as chairman of the board. William R. Hewlett will also remain as cochairman of the board.

There was also speculation that the shake-up was a result of lagging sales in the personal computer area, but that is unlikely, according to Ed White, acting director of office automation services for Dataquest, Inc. Though sales in that area have not been "up to snuff," White said, it is too early in the product's life cycle for HP to set off such massive changes in the company's structure to deal with product sales alone.

White said he believed the reorganization is a "natural progression" for HP, much like similar changes at such giants as IBM or General Motors. "It is probably more of a response to aging people at the top than it is to product sales," he added.

There has been speculation that Young will soon replace Packard as chairman.

It is also possible, White admitted, that HP could be using the reorganization as a smoke screen for internal changes in the business computer area. Paul C. Ely, Jr., formerly head of HP's computer group, has been switched to the company's medical and analytical areas.

According to White, Ely was brought up through the ranks of HP's engineering and scientific environs and may have been "uncomfortable" in the business computer arena.

THE WAITING GAME

The local-area network market had, for the past couple of years, been waiting with baited breath for IBM to unveil its offering. The product would unquestionably become the immediate de facto standard in the local-area network arena.

Despite constant rumors of impending announcements from Big Blue, the local-area network debut mysteriously never happened. This past spring, industry observers were surprised when IBM announced that its offering would not be introduced for possibly two to three more years. Instead, the company offered its Cabling System, the eventual medium for the local-area network. It was, some analysts felt, akin to Ford's introducing the tires and saying the rest of the car would be available in two years.

Although IBM's delay has caused confusion in the already complicated local net market, the setback has actually had a stimulating effect, according to industry analysts. "We've found that users, if they have a need, are not going to wait anymore. They're looking at alternatives," said Christine Hughes, vice-president of the Gartner Group in Stamford, Conn.

Charles Robbins of the International Data Corp. agreed, saying, "Clearly, the IBM announcement has opened up a buying mood. It gives others in the business a tremendous shot in the arm."

Among the benefactors of IBM's delay are the various Ethernet offerings (already an accepted standard) and such specialized local-area networks makers as Ungermann-Bass, Inc. and AT&T. AT&T recently announced its own local-area net offering, the Information Systems Network, which combines fiber optics and existing copper wire for linking workstations, terminals, personal computerss and minicomputers. Most interesting is that the AT&T network is slated to be available in January 1985 (though there is still a question within the industry whether the company can actually meet that deadline).

"AT&T now has a definite window of opportunity," Hughes stated.

According to Robbins, the market's slow development has simply been a response to IBM's lack of product. "A local-area network presents a very difficult decision," he explained. "A company can't really go out and say, 'This is the network for everyone.' Individual managers have had a tough time deciding what is right for their particular group."

Both Hughes and Robbins agreed that the network makers with the greatest advantage are those that promise compatibility with IBM when its network is finally announced. Standards have been both a blessing and a burden: they have served both to de-

lay decision making and to provide a framework for where the market is heading.

Though Robbins is convinced there will be a major increase in buying in the next six months, Hughes said she believes no significant surge in activity will occur beyond the Fortune 500. "We don't see the local-area network market taking off until 1986," she said.

NEITHER RAIN NOR SLEET NOR . . .

WASHINGTON, D.C. — In the face of a burgeoning electronic mail industry, the failure of the U.S. Postal Service's Electronic Computer-Originated Mail (Ecom) operation seems puzzling. To industry analysts, however, there is no mystery. They say Ecom virtually died the day it was born.

The end came on June 5 when the Postal Service's Board of Governors voted to discontinue Ecom and look to private industry to come in and take over the troubled project. In just two years of existence, Ecom had lost upwards of $50 million.

The root of Ecom's problem lay in the fact that it never met the specified requirements that studies had shown for the market. In fact, it turned out that Ecom was not even meeting its own original standards. The system was to have been structured so that messages would be transmitted online from a sender's site to one of 25 serving post offices nationwide nearest the recipient. Each message would then be printed out, put in an envelope and delivered by regular carrier. From beginning to end, the entire process was to take just two days.

Instead, the Postal Service admitted, up to 50% of Ecom messages have not been handled in this way, but instead, they have only been sent to the sender's local post office for delivery as ordinary airmail.

In addition, Ecom's printers couldn't handle color or reproduce corporate logos, and the system was unable to include stuffers or return envelopes, a highly desired feature.

Projected to handle up to 50 million messages per year when it was launched in January 1982, Ecom transmitted only 15 million in its first year. The high-volume user that was expected to employ the service never materialized. Ecom made a last-ditch effort at survival by asking for rate hikes — a ploy that only hastened its demise.

With private organizations looking into the possibility of purchasing or leasing the Ecom system, the market is now wide open for such competitors as MCI Communications, Inc.'s MCI Mail and a new venture called Zapmail from Federal Express. The question industry watchers are asking is whether, in fact, a reasonable market exists out there for a physical delivery system of electronically originated mail.

PC PRICES PARED

The saying goes that when IBM sneezes, the entire industry gets a cold. This cliche may be overdone, but when IBM recently announced price cuts on its PC line, startled PC-compatible vendors got out their handkerchiefs and buttoned up their overcoats.

Why IBM announced price cuts of up to 23% on system configurations and up to 39% on components has been the subject of much conjecture. As usual, IBM had no comment, and industry analysts all leaped up with opinions. According to Tim Caffrey, program manager for strategies for microcomputing and office systems at International Data Corp., IBM has defined a price/performance margin for the personal computer field, a margin that everyone has attacked. "The price cuts were a reaction to market forces," stated Caffrey, "IBM wanted to give everyone a jolt."

Caffrey, along with many other analysts, also believes the move was to reposition the PC in order to introduce a new high-end, multiuser, multitasking desktop machine later this year. The guesstimate is that the new micro will be based on an Intel, Inc. 80186 or 80286 microprocessor and will be a faster version of the PC. In addition, there was agreement that IBM wanted to spur demand in the microcomputer market, which had reportedly started to experience a slowing in growth.

Whatever the ultimate reason for IBM's move, the response from the industry was swift and not unexpected. Most major PC-compatible vendors announced price reductions that would keep their

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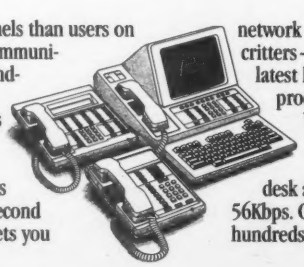


And, thanks to its parallel bus and about 4½ billion bits per second system bandwidth, the CBX II lets you network a whole company full of common digital critters — telephones and terminals — plus all the latest high-performance devices: PCs, word processors, graphics terminals and computers. You can even network networks. On one system.

ROLM can deliver voice and data to the desk at speeds well beyond the much-discussed 56Kbps. CBX II's advanced architecture gives you hundreds of kilobits, using existing telephone wire;

products 10% to 15% below IBM's. Among those announcing cuts were Columbia Data Products, Inc., Corona Data Systems, Inc., Eagle Computer, Inc., ITT Information Systems, Inc. and Zenith Data Systems, Inc.

Analysts agreed that vendors competing against IBM on price alone are the ones in the greatest peril. "Going head to head and board to board against the PC isn't a market I'd like to be in," Caffrey stated. "There has to be a shakeout in that market."

The price cuts have also touched the office market, Caffrey said: "This really tightens things up and puts pressure on everybody."

The cuts may have shaken the industry — an entry-level PC model with one 360K-byte disk drive and monochrome monitor is now priced at $2,520, and a new more powerful version of the XT is priced at $4,920. Nevertheless, for once, the winner is the user.

BITE OF THE APPLE

PENNSAUKEN, N.J. — Franklin Computer Corp. became the latest personal computer distress story when the manufacturer filed for reorganization under Chapter 11 of the Federal Bankruptcy Act. An anatomy of this failure showed declining sales, an expensive legal battle with Apple Computer, Inc. and, according to a company spokeswoman, a "general softness in the personal computer business."

Franklin's troubles may have begun when Apple was awarded $2.5 million last January in a copyright infringement suit that challenged the authenticity of Franklin software for its Ace line of Apple-compatible microcomputers. Franklin still owes $435,000 in court fees.

Another problem was Franklin's inability to obtain a sufficient number of disk drives for its CX line of transportable, Apple II-compatible microcomputers. A Franklin spokeswoman declined to identify the peripheral supplier, but said Franklin held it responsible for "a large part of the problem." The Pennsauken, N.J.-based firm has since found another supplier. Franklin now expects first shipments of the $1,400 to $2,300 CX series, originally planned for June, to begin in late August or September.

Franklin is banking heavily on the success of the CX series, but the company it is competing with — Apple — is an established vendor that can turn out large numbers of computers at cheap prices and has the finances to cut prices. Franklin sales had dropped since April, when Apple slashed prices for its IIe computer. An additional problem seems to have been recent shakeups in Franklin's top management.

SALARY INCREASES DOWN FROM 1983

WILLOW GROVE, Pa. — For the first time in a decade, salaries of administrative secretaries in the U.S. went down. The decline of 3.9% marked the only salary decline among 15 information/word processing job categories in the 10th annual salary survey conducted by the Association of Information Systems Professionals (Aisp).

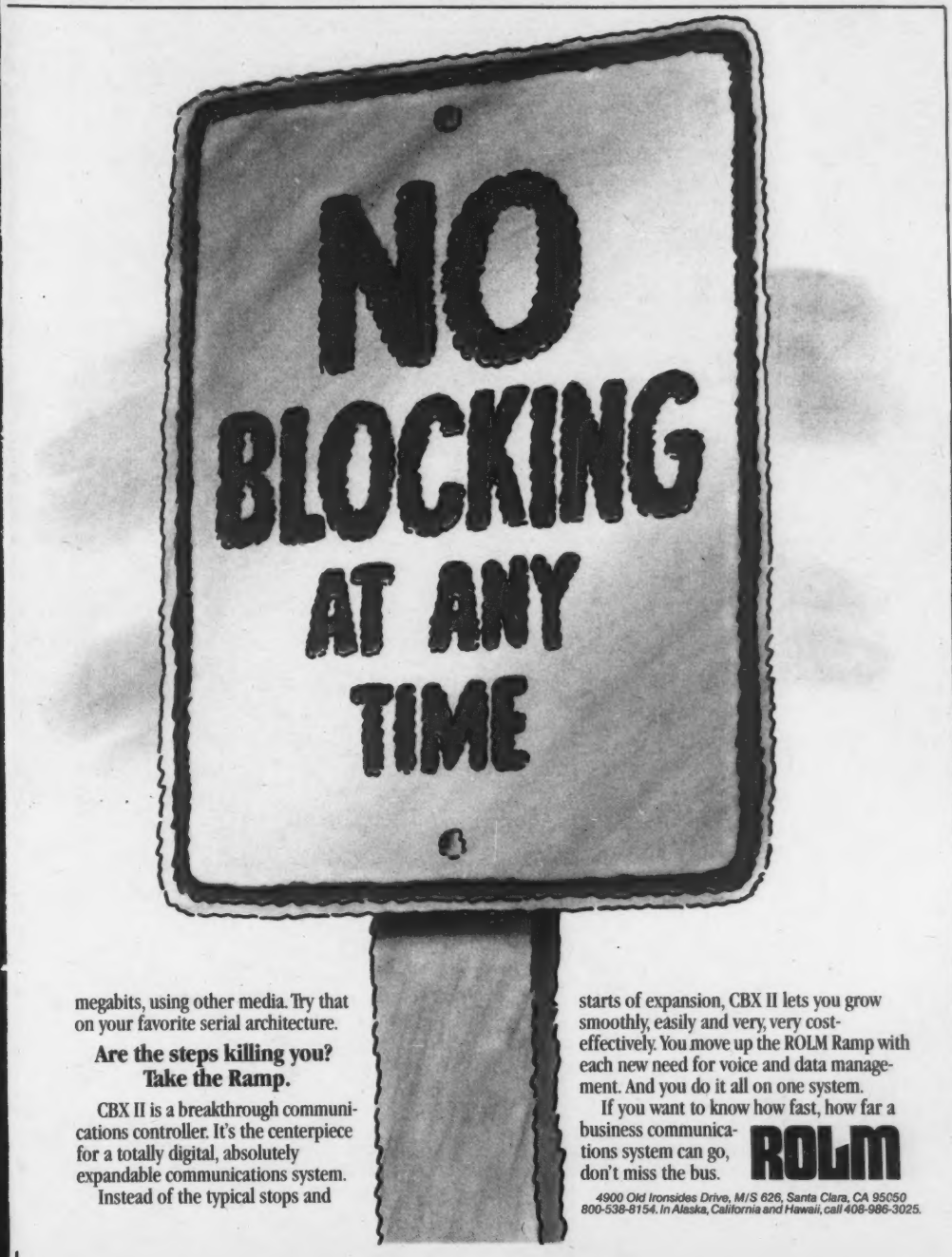
In addition, the survey showed that, although there were increases in the other 14 categories, that rate of growth slowed from the previous year. The figures reflect an overall increase of 5.2%, down from 6% in 1983. The average increase in Canada is 6.8%, down from 7.5%.

The survey, based on reported salaries for 20,518 employees in 2,132 companies in the U.S. and 2,370 employees in 259 companies in Canada, covered a wide range of job categories — from WP trainee to administrative support manager.

Administrative support supervisors experienced the most significant jump in the U.S. and Canada, increasing by 19.1%. Other increases in the U.S. included WP operators (3.3%), WP supervisors (5.1%) and administrative support managers (8.5%). Though the administrative secretary category dipped slightly, the related position of senior administrative secretary actually jumped 3.5%.

The report also includes the high, low and and average salaries; the median or middle occurrence; and the most frequent response for each job category in the U.S. and Canada.

It is available for $40 ($25 to Aisp members) from Aisp, 1015 N. York Road, Willow Grove, Pa. 19090.



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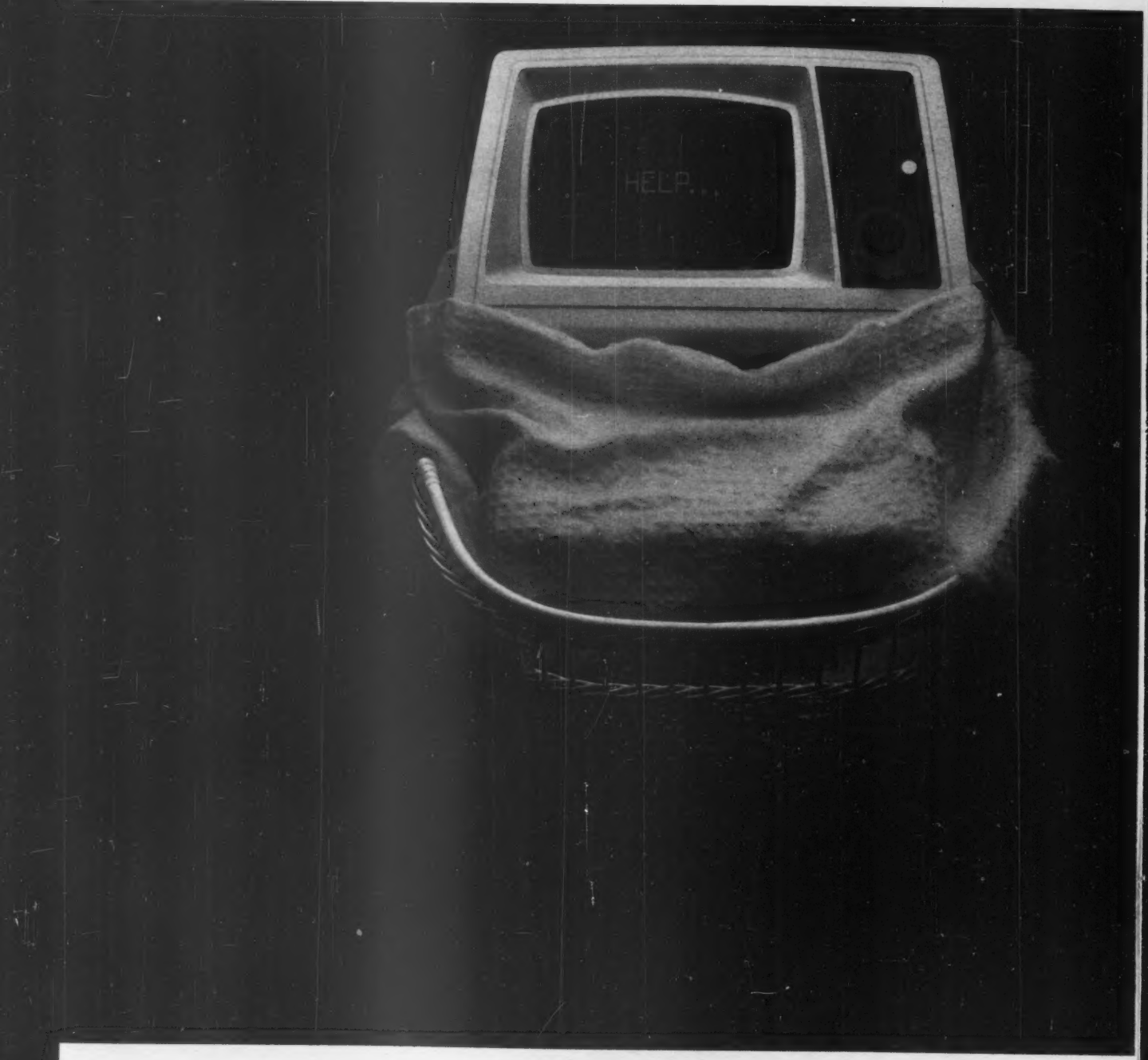

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OA BRIEFS

CHICAGO — Management Science America, Inc. (MSA) and Applied Data Research, Inc. (ADR) have teamed up to share applications and systems software technology and to jointly market products.

MSA will market a version of ADR/Datacom/DB and ADR/Datadictionary that can be embedded into MSA's manufacturing. Customers will receive support from both firms.

For more information contact MSA, 3445 Peachtree Road, N.E., Atlanta, Ga., 30326, or ADR, Rt. 206 and Orchard Road, CN-8, Princeton, N.J. 08540.

SAN JOSE, Calif. — Low-priced bit-mapped graphics terminals have stimulated growth in the graphics terminal industry, according to a report by Dataquest, Inc. The report, published for Dataquest clients, said seven manufacturers are selling bit-mapped terminals for less than $2,000, and predicted that other vendors will follow. Dataquest predicted that 10,000 to 15,000 of these low-priced terminals will be shipped by the end of this year.

More information is available from Dataquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

WESTBORO, Mass. — Data General Corp. and Cullinet Software, Inc. signed an agreement to integrate DG's Comprehensive Electronic Office (CEO) system and Cullinet's Information Data Base (IDB). The combination of these two products will allow CEO users to access data base management systems on IBM mainframes. IDB gathers and summarizes corporate information stored in mainframe data bases.

DG also signed an agreement with MCI Digital Information Services Corp. aimed at integrating the CEO system with MCI Mail, an electronic mail system. DG will market the product.

For more information contact Data General Corp., 4400 Computer Drive, Westboro, Mass. 01581.

WELLESLEY, Mass. — An increasing number of companies are actively considering purchases of OA and communications products, according to a report by Venture Development Corp. The report, "Office Automation Survey: Analysis of Acquisition and Use of Office and Communications Equipment," said voice mail and local-area network products are more likely to be purchased by current nonowners.

Venture said more than 88% of those surveyed were satisfied with the reliability of the OA equipment they own. The report is available for $1,850 from Venture Development Corp., One Washington St., Wellesley, Mass. 01281.

PHILADELPHIA — The demand for software engineers and programmers is rising sharply, forcing employers to offer these specialists salaries up to 30% higher than those of one year ago, according to a survey released by Dowden & Co., an advertising and public relations firm.

The study, "1984 Update: U.S. Computer Field Jobs and Salaries," reported that the demand for computer professionals overall is up 15% from 1983. The report said many companies see women as a major source of new staff.

More information is available from Dowden & Co., 3718 Highland Ave., Drexel Hill, Pa. 19026.

WASHINGTON, D.C. — The market performance of the U.S. computer and peripheral equipment industries in 12 countries is documented in the Annual Worldwide Industry Review, published by the Commerce Department.

The one-volume publication features product shipments to each country during the past five years, as well as identifying those countries with the greatest potential for market growth.

The report is available for $200 from U.S. Department of Commerce, P.O. Box 14207, Washington, D.C., 20044.

WILLOW GROVE, Pa. — Salaries for lead word processing operators in the U.S. this year jumped 5.2% to an average of $304 weekly, according to a survey of 338,077 office workers in 117 North American cities conducted by the Administrative Management Society.

In the U.S., the average office worker's salary rose 3.1%, from $262 to $270 per week.

The report costs $100 from AMS, 2360 Maryland Road, Wilow Grove, Pa., 19090.

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LOOKING AT MICRO USERS

BY JUDITH A. QUILLARD
AND JOHN F. ROCKART

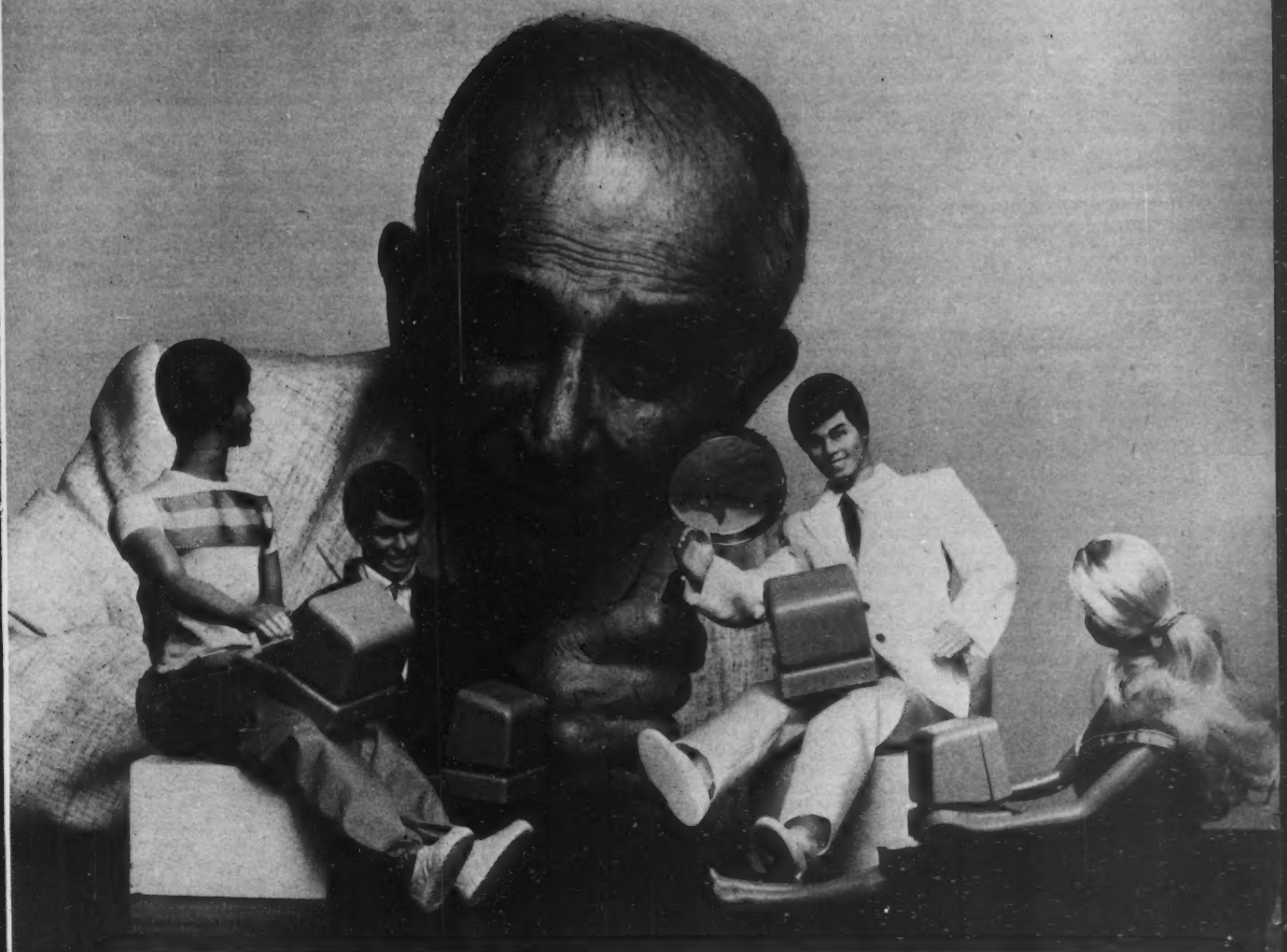


PHOTO © 1984 MORT RABINOW/CHRIS TURNER

In the corporate environment, the personal computer has become an integral part of — if not the major impetus behind — the phenomenon of end-user computing. This article summarizes results from a research project conducted at MIT's Center for Information Systems Research (Cisr). Our intent was to understand the way personal computers should be managed. We interviewed information systems managers and managers and professionals who use personal computers.

Of the 83 users interviewed, 68 held staff positions; the greatest concentrations were in finance (15) and corporate strategy/planning (11). Other staff groups represented were distribution, purchasing, research and development, management information systems (MIS), marketing, engineering and personnel. The remaining 15 users held line positions.

Previous experience with computers ranged from 30% who had little if any prior experience to 13% who had been computer professionals at some point in their careers. Another 18% had had

significant programming experience. The remainder of those interviewed had had some experience with traditional programming languages, fourth-generation tools or specialized applications such as word processing.

Multiple responses were allowed to a question of how people initially learned to use their personal computers. Seventy-three of the 83 users said they taught themselves, primarily with the manual. Learning through formal classes, peers and other options were mentioned only 21 times in total. It is clear that users of all backgrounds and experiences are turning to manuals and teaching themselves through trial and error.

This general picture of the users indicates people are formulating their own opinions of the usefulness of personal computers. They are able to learn about personal computers on their own time, using resources they feel comfortable with, rather than relying on information systems to provide them with information.

This picture of relative self-sufficiency may not always hold true, however. From the perspective of research on the diffusion of innovations, the users we interviewed are most likely the "innovators," "early adopters" and, perhaps, some "early majority" types. Innovation research has established that the different categories of adopters have different personality traits, socioeconomic characteristics and communication behavior. The nature of the user population is likely to change as the use of personal computers spreads and, because of the obvious implications for education, training and ongoing support, organizations should be aware of these differences.

A previous CISR study (of time-sharing users) defined several distinct types of end users. The categories were based on observations of "the computer skills, methods of computer use, application focus, education and training requirements, support needed and other variables" of 200 time-sharing users.

This categorization is also useful in the personal computer study. The user types follow:

- **Nonprogramming end users** use software provided by others to access computerized data through a limited, menu-driven environment or a strictly followed set of procedures.
- **Command-level users** perform inquiries and simple calculations and generate unique reports for their own purposes. They understand the available data bases and are able to specify, access and manipulate information.
- **End-user programmers** utilize both command and procedural languages directly for their own personal information needs. They develop their own applications, some of which may be used by others.
- **Functional support personnel** support other end users within their particular functional areas. By virtue of their skill in end-user languages, they have become informal centers of systems design and programming expertise. In spite of the large percentage of time they spend supporting other end users, these individuals do not view themselves as programmers or DP professionals.
- **End-user computing support personnel** are usually located in a central support organization, such as an information center. Their exact roles differ from company to company. Most are reasonably fluent in end-user languages and, in addition to aiding end users, they sometimes develop either support or application software.

Nonprogramming end users	1
Command-level users	29
End-user programmers	30
Functional support personnel	17
End-user computing support	6
	83

Figure 1. Classification of Personal Computer Users

Figure 1 shows the classification of the 83 personal computer users. The most common types, as expected, were command-level users and end-user programmers. It should be noted that, for the most part, these end-user programmers were not utilizing traditional programming languages such as Basic and Fortran. Many were using software tools like Visicorp's Visicalc and DSS/F to develop complex models. Often they were familiar with several software packages.

An obvious question is whether a person's computing background could tell us the user category into which that person would fall. Although some patterns do emerge, previous computer experience cannot definitely predict the level of personal computer use. A safe generalization is that most user programmers and functional support types have had at least some prior programming experience. Also, at this point in time, most personal computer users with little previous computer experience are at the command level.

Applications: During the interviews with personal computer users, a total of 187 applications were identified. For each person's most important application (and, occasionally, for the two or three most important), we completed an "application questionnaire") with detailed data on 101 "important" applications. For the others, only limited data was obtained.

The two columns in Figure 2 show the purpose of all 187 applications and of the 101 key applications. The significant majority of applications are analysis — primarily financial analysis, which covers a broad range of applications, from budgeting to product pricing to financial statement work.

Report generation, which includes presentation graphics, was rated second in importance. These applications perform minimal calculations such as column totaling; about 60% of them produce graphics, charts or plots.

Although word-processing is a popular use for the personal computer, only five of the total 19 WP applications were included in our sample of 101, and most people said other applications were more important. Our assessment of this finding is that, although WP is not the application for which people initially acquire personal computers, many managers and professionals find WP software to be a very useful tool and would now hate to be without it.

Monitoring applications, which captured fourth place, consist of such things as project scheduling, maintenance of approved customer lists and tracking monthly environmental data from plant sites. Relatively few (only eight) of the 187 systems could be classified as operationally involved with the day-to-day transaction processing of the firm. These are traditional paperwork processing systems, such as inventory control and product accounting.

	All 187	The 101
Analysis		
Financial	77	40
Marketing	8	6
Corporate planning	8	7
Statistical	8	4
Engineering/scientific	5	5
Production planning/scheduling	3	2
Other analysis	4	2
Report Generation	19	12
Word Processing	19	5
Monitoring	16	9
Operational	8	4
Communications	7	1
Data Collection	5	4

Figure 2. Purpose of Application

Seven people mentioned that a significant use of their personal computer was communications with other systems. These applications included accessing external data bases (such as Dow Jones) and using electronic mail. Finally, the data collection applications are those where the personal computer is interfaced to lab equipment in order to sample experimental data and perform scientific calculations.

As a rule, fourth-generation packages were used to develop these applications. More than 50% of the applications were developed using one or another of the available spreadsheet packages as a software tool.

Only 19 of the 101 applications were developed using traditional programming languages, and the most popular language was Basic. (The people who used these languages had prior programming experience.)

For the most part, the tools fit the applications. We did note a number of cases where users were overworking their software, especially Visicalc. They filled the spreadsheets to the maximum and noted poor performance and slow calculation and response times.

This data on applications contained no major surprises. In their use of the initial wave of personal computers, people are primarily utilizing them as stand-alone machines to perform analysis with spreadsheet packages.

The dominance of financial spreadsheet applications is easy to explain. First, high-quality software is available. Personal computer spreadsheets are easier to learn and easier to use than spreadsheet software currently available for mainframe time-sharing use (at least, that is the opinion of the users we studied).

Second, the design of financial spreadsheets is a conceptually straightforward process for personal computer users. The first logical step in applications development is to write a model of the application on paper. Many managers and professionals have long had well-conceptualized spreadsheets on paper. In addition, financial applications usually work with amounts of data that are not too large to be practical for current personal computers. The personal computers are operating as stand-alone machines, and this favors applications that handle smaller amounts of data. In 66% of the applications, the data used was manually keyed in.

The third and final reason financial spreadsheets were dominant is that financial analysis

(Continued on Page 14)

The MIS View

The long-term strategies for end-user computing were similar in all 10 companies and centered around the concept of the workstation. It was generally agreed that each workstation would be to some extent custom-tailored to its particular user. Most companies viewed the personal computer as the forerunner of the multifunction workstation.

In the short run, the 10 companies saw several important roles for the personal computer. Most often mentioned was the personal computer's ability to increase the level of computer literacy at these firms. Some companies mentioned the ability to reduce applications backlog faced by their information systems groups. Several companies were using the micro to bring computing to places where it would otherwise be impractical.

Current purchases of the majority of personal computers, however, are not part of a well-considered long-term strategy. They are being acquired because individual users want them.

Who has responsibility for formulating personal computer strategy? In seven companies, information systems management develops directions concerning personal computers. The other three had committees composed of user and information systems managers.

The "Big Eight" accounting firm was one of these three, apparently because of the potential impact of the personal computer on the way the firm will conduct future business. The committee is a user committee with informations systems representation.

In two of the three firms, the major reason for a steering committee was to allow the active participation of user management.

Contrary to what users would prefer, strategy formulation for personal computers in most firms is rather isolated from strategy formulation for other end-user computing (timesharing) and office automation. This is true mainly because responsibility for these areas has been assigned to different groups within the information systems organizations. The notable exception was one company in which a committee sets policy in all areas.

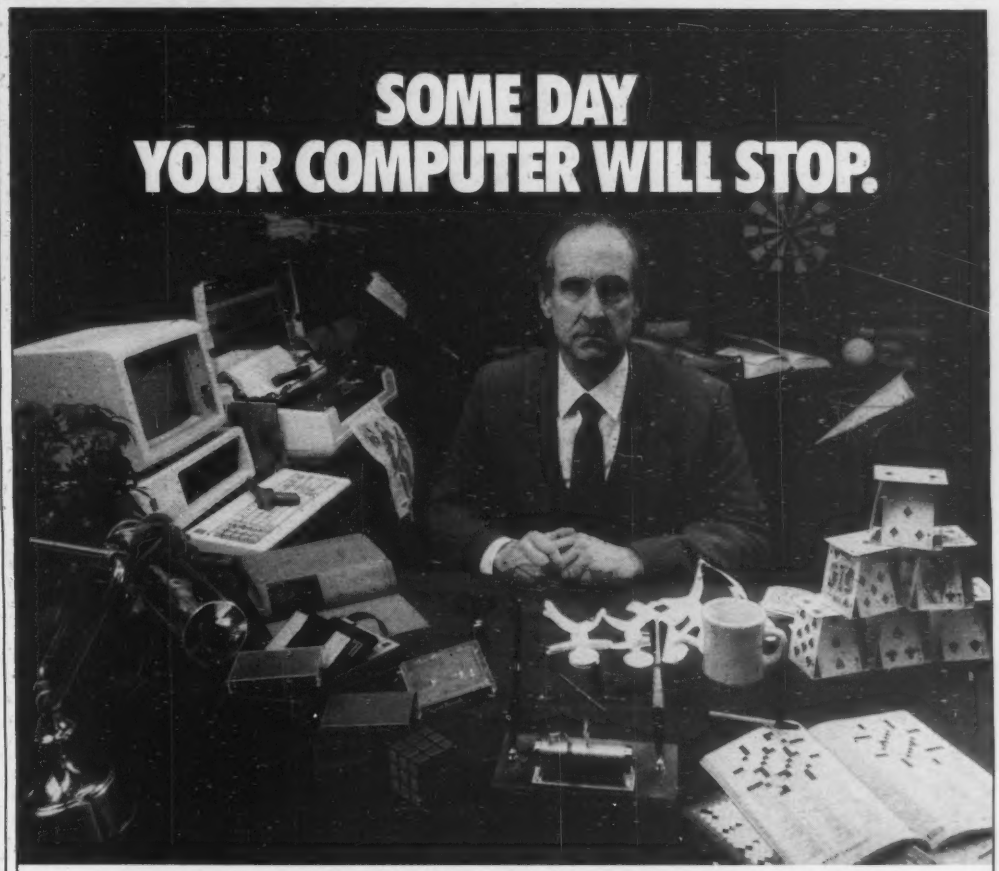
All but one of the firms had issued a written policy statement specifically addressing the use of personal computers. These policies varied considerably in terms of formality, scope and detail. Most organizations had developed policies and standards, or were considering doing so, in the key areas of justification, hardware, software, acquisition and servicing, data, copyright laws and applications guidelines.

Organizational approaches to providing support to personal computer users varied among the 10 companies. Four firms had established separate and distinct "corporate personal computer groups" and two firms had given personal computer responsibility to existing information centers.

Four firms had given responsibility for support to divisions, either through existing systems managers or by establishing new groups.

The personal computer group staff tended to number two to five.

The group manager was usually from the information systems organization, but very frequently had had significant experience interacting with users.



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(Continued from Page 12)
involves applications that are probably low on the priority list of information systems development projects. A production planning application is probably a good mainframe candidate given its scope, significance and number of users. But a financial analysis application tracking the production department's budget and expenses probably is not.

Figure 3 presents the reasons why users chose a personal computer over other alternatives (such as the traditional information systems development process or time-sharing) for these applications. First on the list and most often mentioned is the statement that the software was available only on a personal computer, not on time-sharing. In other words, the evident, widely publicized availability of spreadsheet packages caused people to choose personal computers.

Cost was the next most frequently mentioned reason. Users said buying a personal computer with packaged software and then developing the application themselves was cheaper than other computing alternatives. A few people interviewed noted that they could justify the cost of a personal computer based on the reduction in their time-sharing expenditures.

The next three reasons on the list were often mentioned together. Underlying these statements is the fact that using a personal computer makes users independent of any other group for access to their application. Slow response times on time-sharing systems or difficulties with communications lines were factors for some people. Being in control of the tool was very important; it was even cited as the primary reason slightly more often than "software only on personal computer."

There is another important grouping of two interrelated reasons: "The personal computer is readily available; I have access to it and already know how to use it," and "It is relatively fast and easy to develop an application on the personal computer." People were implying that using a personal computer is easier than using time-sharing. After successfully implementing one application, a user was not at all reluctant to develop another. Our impression was that some of these applications were developed only because a personal computer was available.

Twenty people mentioned "frustration with information systems development" as one of the reasons for selecting a personal computer for their application. Out of 101 applications, 20 is not an overwhelming number. However, the reasons "fast/easy development" and "feeling of control/independence" are in some respects positive ways of stating dissatisfaction with information systems services.

A small number of people said their manager had decided a personal computer was the appropriate vehicle for the application. An even smaller number of users said security was a reason the personal computer was chosen.

Reason	Times cited as primary	Total times mentioned
Software only on PC	13	46
Cost	10	41
Feeling of control/independence	15	32
Assured access to computer	3	21
Response time	1	18
PC readily available	11	37
Fast/easy development	4	25
Frustration with I/S development	3	20
Told to by supervisor	4	15
Security	2	8
Other	7	29

Figure 3. Why A Personal Computer?

Support: Although most of the 10 firms had established formal personal computer support groups (see "MIS View" on Page 13), a significant number (28%) of users feel self-sufficient, as shown in Figure 4. Also, many users (21%) turn to someone within their department for ongoing support, often on an informal basis. According to these statistics, many current personal computer users believe they know enough to solve most of their own problems; this belief may have resulted from their learning by reading the manuals and by trial and error.

Apparently, for several key reasons, users are turning to others in their departments for support. The first reason is physical proximity; it is simply easier to go to someone whose office is down the hall. Closely related is the fact that people are often less hesitant to ask help from someone they already know, especially if they are unsure whether theirs is a "dumb question."

In addition, users often prefer to get computing advice from someone who knows the functional area and therefore can understand the context of their problem much more completely. Finally, many users do have a great deal of experience with various personal computer software packages; in some instances, their knowledge exceeds that of the information systems support group.

The importance of the function support people we found in various user departments should not be underestimated. Functional support in all instances was outside the information systems organization. As noted earlier, the people providing functional support are personal computer users assisting others in their department. In three companies, we found cases where the role was a clearly acknowledged part of the person's job. The other functional support people were informal sources of support.

Although the number of users turning to other users for ongoing support is about equal to the number turning to information systems, this fact should not be misunderstood. Users do not think information systems support services are unimportant. We asked users (and information systems managers) about the provision and importance of various personal-computer-related services.

To summarize briefly, personal computer users believe many important services can be provided by a formal support group run by information systems. In some cases, users noted that although they personally might not need a given service, they could see its value for less experienced users. We found two especially important service areas, one relatively unimportant area and one problem area.

The first of the two key areas in which personal computer users believed formal support was most important was consulting on appropriate solutions for a given application problem. Users would like to go to one designated person, not to separate personal computer, time-sharing, and OA groups, for this advice.

The second area in which formal support was considered important was that of services that help personal computer users to get started. Following consulting, the specific services rated most important included access to software packages (to allow users to try them before buying them), central purchasing and training. Users want knowledge of product evaluations and applications developed by others.

	Times Mentioned	
Self-sufficient	22	28%
Formal group in user department	5	6%
People in department informally	17	21%
Formal PC group within I/S	13	16%
I/S department	13	16%
Computer stores/other	10	13%
	80	100%

(Data from 70 users; multiple responses allowed)

Figure 4. Sources of Personal Computer Support

To a large extent, these areas were being actively supported by information systems. The most common services, offered by nine of the 10 firms, were central purchasing, hardware evaluation and selection, software evaluation and consulting about whether a personal computer is an appropriate solution.

Software development services were rated relatively unimportant. Both users and information systems managers gave systems and applications software development the least important ratings of all services. These relatively low scores indicate users believe they can rely on themselves and the marketplace for most of their software needs. This is a logical extension of the findings that showed most applications use fourth-generation tools like spreadsheet packages.

The major problem area regarding support services involves data. Access to corporate data is an increasingly important service, and it will have to be provided by a central group in the information systems organization. According to the personal computer users we interviewed, information on the data available and help in obtaining extracts from corporate data bases are important services, although not significantly more important than many other services we mentioned. In their view, data availability will become more critical over time as more and more users want to download data from the mainframe.

However, a reason for concern arises when we note that few information systems departments were providing data-related services. Users cannot go elsewhere for data base extracts, as they can for some other services. Except in two companies that had policies forbidding personal computer users direct access to mainframe data bases, information systems managers recognized the importance of the data issue. To be fair, the technical obstacles in trying to link personal computers and mainframes should be noted. In the early 1983 timeframe of these interviews, good, reliable hardware/software for personal computer-mainframe linkage did not widely exist — and is still far from what might be desired. This problem area continues to exist.

Implications and Recommendations: Personal computers must be managed in the context of end-user computing. From a management perspective, the key implications of our study revolve around the need to clarify the roles and responsibilities of information systems management and user management with regard to end-user computing strategy, control and support.

Perhaps the most critical message is that organizations need a

strategy for the use of personal computers. Even more important, is the need for an overall strategy for end-user computing. Eventually, this strategy must integrate time-sharing, personal computers, graphics systems and OA and fit these tools into the overall information systems strategy.

This end-user computing strategy must be reflected in plans and policies. Most information systems departments have four-inch-thick documents describing their plans for traditional information systems and only four-page memos for end-user computing. A strategy is needed so that growth in end-user computing is perceived as fitting into corporate long-range plans. This requires the involvement of key staff and line management in planning.

Users must be active in establishing personal computer strategy, plans and policies. We advocate a committee composed of information systems management and user management — a very effective mechanism for making strategy and policy decisions. In our study, one company had such a committee responsible for OA, personal computers and time-sharing; that company was doing a very effective job of managing end-user computing.

User departments need to take additional computing management responsibility. End-user computing means applications development is done by users. The user departments must control justifications and must manage use; information systems cannot have primary responsibility for this process. The managers responsible for control and management should have a voice in strategy and policy. Clearly, to make informed business judgments, user management will have to be educated about the potential benefits and drawbacks of personal computers (and other end-user computing tools).

Information systems expertise is needed to help set policies and guidelines. The information systems department's role is to manage information technology for the firm. In order to ensure coherence with the overall information infrastructure of the firm, information systems must be active in the setting of strategy and standards. This implies that information systems must fully understand personal computers and other end-user computing technologies.

In addition, the recognition of a joint effort between information systems management and user management should also extend into the area of providing support. As our study shows, users are getting support not only from information systems, but also from other users. The important role of these functional support people should not be overlooked. This strongly suggests that information systems should establish links with functional support people. And, since we know users often turn to other users because they are local, information systems support should not be totally centralized. End-user computing support groups under the information systems umbrella should also be located at the divisional or even departmental levels.

In short, we need to redefine the roles of information systems management and user management in the new computing environment. Managing end-user computing must now be a partnership effort. OA

Quillard is associate director, CISR, Sloan School of Management, MIT, and is currently studying corporate use of PCs.

Rockart is director of CISR. Among his most recent research interests are "critical success" factors and the management of end-user computing.

About the Study

The study reported here is part of ongoing research into management of end-user computing being conducted at MIT Sloan School of Management's Center for Information Systems Research.

Between November 1982 and April 1983, 83 users of personal computers and 34 information systems managers in 10 major U.S. firms were interviewed. The 10 corporations included two industrial firms with sales of over $1 billion, a large commercial bank, a major insurance company, one of the Big Eight accounting firms, three Fortune 500 companies that produce personal care and/or food products and a major energy company. The full results are in "A study of the Corporate Use of Personal Computers," by J.A. Quillard, J.F. Rockart, E.C. Wilde, M.A. Vernon and G.B. Mock [Cisr Working Paper No. 109, MIT, Cambridge, Mass., December 1983], available for $4.00 from Cisr (E40-193), MIT, 77 Massachusetts Ave., Cambridge, Mass. 02139.

The project was a continuation of research that focused on time-sharing users (see "The Management of End-User Computing: A Research Perspective," by J.F. Rockart and L.S. Flannery, *Communications of the ACM*, October 1983).

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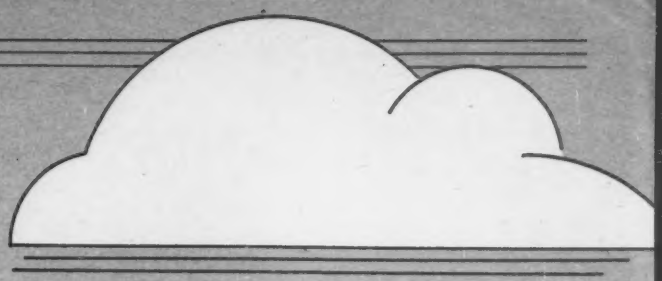


Moving Ahead With Local Nets

BY ROBERT M. METCALFE
AND N. DEAN MEYER

As the number of personal computers grows, the interest in local computer networks is also increasing. The current interest in local networks of personal computers is justified by their potential benefits. Networking may contribute substantial cost savings, improve productivity and supply powerful value-added benefits. The rapid spread has raised important management issues — such as compatibility, reliability, justification and timing.

There is still some confusion in defining the local network. Three types of digital information networks exist: terminal-to-terminal, terminal-to-computer and computer-to-computer.

Terminal-to-terminal networks include Telex and facsimile devices. Terminal-to-computer networks, using protocols such as SDLC and 3270, are generally low-speed, star-shaped networks that replace bundles of cables emanating from the host computer.

The common term "local-area network" usually refers to digital computer-to-computer networks. For clarity, we will refer to these as "local computer networks" or simply "local networks." Three technologies are used: private branch exchange (PBX), CATV and baseband.

Network technologies: PBX networks generally provide the 4.4 kilohertz of analog-transmission bandwidth required for telephony to networks, and, when digital transmission is added, can support RS-232 or V.24 terminal communications. PBXs are most appropriate for terminal-to-computer networking and generally carry the traffic going over the longest distances at the slowest speeds.

So-called broadband computer networks use cable television technology, providing as much as 400 megahertz of analog bandwidth for broadcast television. In adapting the standard one-way CATV to network applications, the bandwidth is generally frequency-divided into many small channels. CATV is most appropriate for bundling together many lower-speed lines. For example, Sytek, Inc.'s Localnet, one of the faster broad-

band networks, provides channels of up to 128K bit/sec each.

Digital baseband networks can provide their entire bandwidth when required between any two points. This is, in fact, a "broadband" channel, with greater bandwidth than is generally provided to each channel on a CATV. Ethernet, the international standard, carries data packets at 10M bit/sec. Digital baseband networks are therefore good for handling bursts of data, the type of traffic generated by communications between computers. For short distances of a kilometer or less, baseband will likely be the most cost-effective way to link personal computers.

The digital baseband approach prepares for an all-digital world. The emphasis is not on saving wire, but on integrating communications. A baseband approach uses separate cables for separate purposes, just as, in buildings, there are separate networks of pipes generally to deliver hot water, cold water and water for fire sprinklers and to return waste water. The difficulties involved in combining and then separating the various types of water exceed the costs of multiple pipes.

Digital baseband networks will be used to carry voice and video only when these take a digital form. Effective integration of voice, video and data will be achieved as voice and video become data.

It would be possible to provide baseband-type delivery over broadband networks, eliminating the need for separate baseband cabling. Even when available, that approach may not be cost-effective in most applications environments, as each interconnection of broadband is far more expensive than a baseband link.

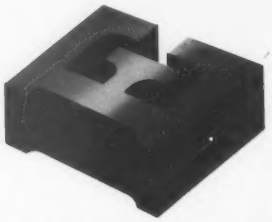
Some organizations have thought to change to a multichannel broadband network when a baseband network became overloaded. However, doing so does not solve the loading problem. The reason to replace baseband with broadband would be to send video signals, or because there were a large number of slow-speed terminals to connect. When a single baseband network fills up, the increased load can be handled by partitioning the personal computers into clusters, which are then connected via gateways, creating cellular baseband internets.

Networks can be interconnected by several devices. Repeaters are unintelligent, unbuffered devices that amplify signals from one transmission medium of like kind to another (for example, from one coaxial cable to another). Bridges are unintelligent but somewhat buffered devices connecting one transmission medium to another kind of transmission medium (such as connecting baseband, broadband and voice lines.) Gateways are computers that translate the protocols of one networking scheme to another.

All three network technologies — PBX, CATV and baseband — are likely to coexist, each serving a different set of needs. Vendors are already working on interfaces between the various technologies. Bridge Communications, Inc. and Sytek, for example, will provide a gateway to Ethernet. A PBX offered by Intecom, Inc. now handles both digital voice lines and Ethernet.

Levels of compatibility: The International Standards Organization's (ISO) seven-layer, Open Systems Interconnection (OSI) Reference Model is an accepted way of defining the different levels of compatibility required in a network.

IBM's Systems Network Architecture (SNA), like Digital Equipment Corp.'s Decnet and Xerox Corp.'s XNS, is a higher level ar-



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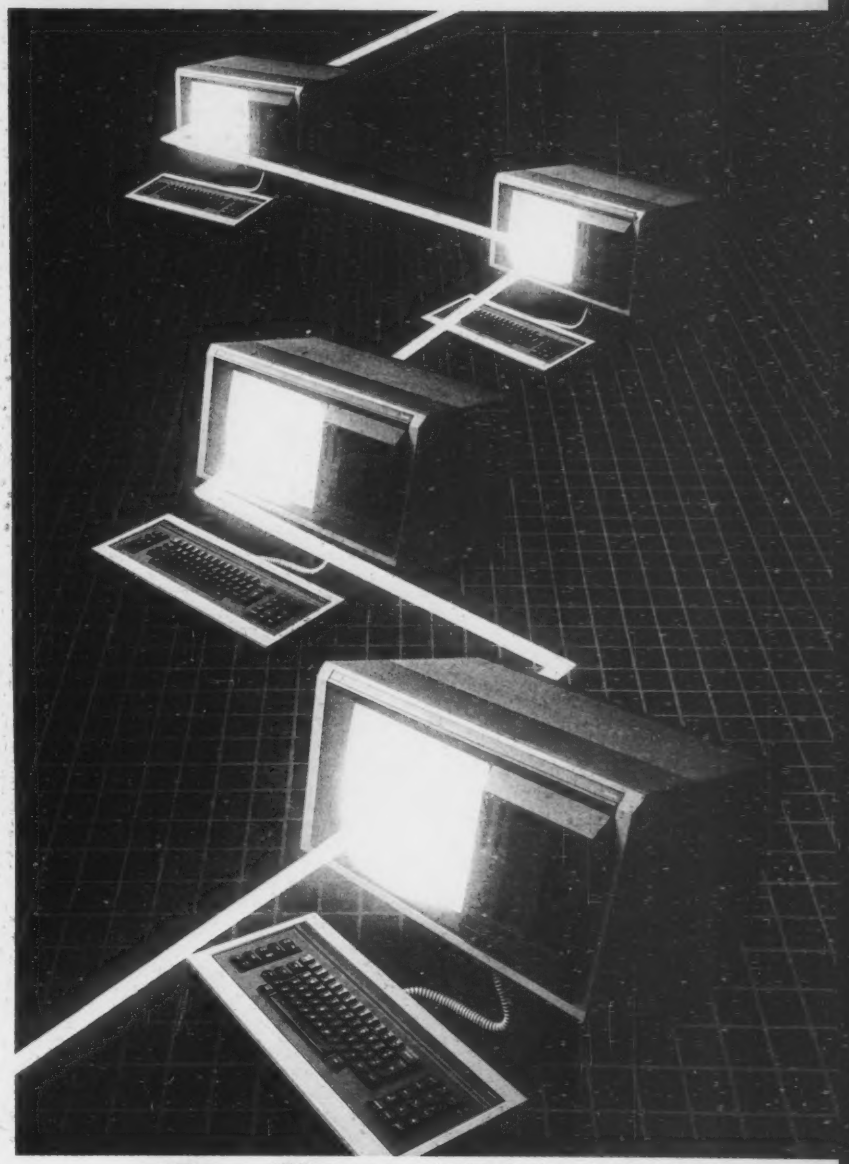

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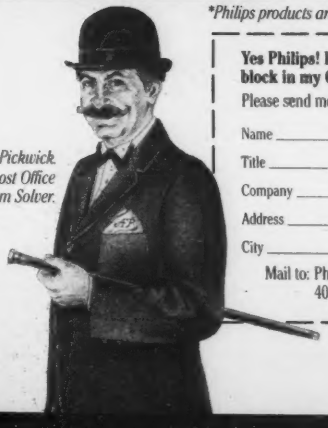

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chitecture (levels 3 through 7 in the ISO model). A variety of local digital networks (levels 1 and 2), such as RS-232, 3270, Ethernet and, in the future, IBM's token network could exist as transmission media within SNA or another high-level architecture.

There is far more stability and compatibility at the link level than at the higher levels of network architecture. It may take anywhere from one to five years before standards will be adopted for document formats, character sets, addressing and routing formats and electronic mail protocols. Yet it is this higher level of compatibility that is required to move information among the various devices on the net. For example, one might put a Xerox laser printer and an IBM Personal Computer on 3Com Corp. Ethernet; although they accept the same cable, they have no compatibility.

While organizations like ISO are unlikely to adopt the standards of any one vendor, manufacturers' behavior does affect the process of setting standards. The production of Ethernet VLSI chips, for example, is lowering prices and increasing the availability of baseband systems in the marketplace. Market share has significant influence on the deliberations of standards-setting bodies. At the higher levels, emerging standards include IBM's Disoss, Wang Laboratories, Inc.'s OIS, Visicorp's DIF and teletex.

Local network reliability: Network reliability is a difficult issue, particularly when the networks interconnect the products of several vendors.

Some networks have built-in fail-safe mechanisms, monitoring and diagnostic systems and redundancy. However, the extra engineering and systems complexity required by this approach can itself be a source of problems. The law of diminishing returns applies here; as fail-safe systems grow more complex, the tendency to create false alarms increases.

A multivendor network-based system poses special problems. In cases where the network and computers were bought as a package from a systems integrator or a computer store, the responsibility lies with the retail vendor. However, few large systems are acquired through a single source. Ultimately, the one responsible is the one who bought the equipment; in the future, perhaps the management informations systems (MIS) staff will serve as systems integrator.

Networking software: Although the cost of network hardware will continue to drop, the exciting technological advances in the future will be software improvements. The development of higher level protocol standards and new application software for local networks of personal computers holds the promise of a new kind of network environment. At present, we see five kinds of software in network environments:

- Network-resistant, standalone software represents a relatively small percentage of personal computer application software available today. Either the network or the application software fails to use the operating system in a standard way.
- Most application software is network-transparent; this single-user software can access remote data bases, printers or other networked resources without being modified.
- Network-delivered software is distributed by a network server, eliminating the need for every user to have individual diskettes and lowering the cost of licensed software. The switch from floppy to Winchester disk operating speed can significantly improve system response times.
- Network-multiuser software, that is, software designed to run in a network environment, eliminates the problems of concurrent usage associated with network-transparent, single-user software. Record-level locking, for example, allows only one user at a time to modify a given record in a file. Security is another concern unique to network-based software. A growing number of personal computer data base and business transaction systems are available with multiuser capabilities.
- Network-integrated software — in upcoming versions of products like Lotus Development Corp.'s 1-2-3 and Visicorp's Visi On — provides multiple tools that run on various nodes of the network. Through this kind of network software, data can be moved from application to application, regardless of where it is on the network or where it originated.

Networks help users take full advantage of the power of the personal computer. Moreover, using local computer networks results in lower costs through peripherals sharing, improved information access and enhanced personal communications.

Justifying local networks: As more personal computers are used, networks become not only more feasible, but almost a necessity. At the same time, the personal computer's power and functionality have increased, and the cost of high-speed digital access has rapidly fallen. For example, Ethernet very large-scale integration developments will continue to reduce the cost of this particular kind of network by a factor of from two to five every year through the mid-1980s.

Networks help users take full advantage of the power of the personal computer. Moreover, using local computer networks results in lower costs through peripherals sharing, improved information access and enhanced personal communications.

First, local computer networks allow personal computers to share peripherals, including hard disks, printers, modems and gateways to other networks. Sharing printers is especially cost-effective; it substantially reduces the cost per user of letter-quality printers, and it may make feasible high-speed laser printers and typesetting machines. Indeed, laser printers may soon be the primary reason users will want to be networked. By replacing the need for multiple printers and modems, sharing peripherals may in part justify the cost of the local network. Moreover, peripherals are often expensive, noisy, unreliable and infrequently used; sharing them saves money and time.

Second, shared file systems on large Winchester disks facilitate group collaboration. Widespread access to distributed hard disks will tend over time to locate vital sources of information in departmental rather than personal or mainframe data base systems. Furthermore, Winchester disks provide much faster response times and are more cost-effective than individual floppy disk systems. Centralizing disk storage at the work group or departmental levels locates a source of noise away from the users. It also tends to be safer; it generally permits more reliable indexing, media protection and backup procedures.

Third, local networks provide cost-effective electronic mail between personal computers. This may be provided in the network file system, or through a gateway into a central electronic mail system. Personal computer-based networks are having a dramatic effect on electronic mail, because they can quickly transmit longer messages that contain forms of data (spreadsheets and graphics, for example) not easily transmitted through an RS-232 interface.

There are other benefits to justify local networks. The network can also be used to balance the processing load among many CPUs and give controlled access to software without the extra cost of licensing and physically delivering it to each CPU.

Deciding on local networks: Companies are using both top-down and bottom-up approaches to the selection and implementation of local networks. Top-down decisions usually involve corporate task forces that study organizationwide requirements, then collect information and request proposals from several vendors. This process tends to culminate in a major procurement and the issuing of restrictive corporate standards. While this is going on, there is often a moratorium on personal computer and network purchases.

Bottom-up approaches usually involve operational managers who use their own budgets to purchase equipment from retailers or systems integration houses. They install networks to solve local problems, often without considering organizationwide issues.

Bottom-up purchases tend to dominate the early stages of diffusion. When the proliferation of personal computers and networks reaches a critical mass, a top-down decision can tie them all together. At present, most personal computers are purchased bottom-up through retail stores. Some vendors are now packaging inexpensive systems for networks with roughly three to 10 nodes. This approach also supports the growing small business market for personal computers, which includes applications other than individual decision support. In an architecture of multiple local networks, compatibility will probably be attained through gateways between networks, rather than by a single, organizationwide network.

The emergence of top-down procurement decisions inside large organizations should start in a year or so. These networks will be on a scale large enough to require a central decision and top-down procurement.

Whether the decision is made by the end user or by the OA staff, there are three steps in deciding to acquire a local computer network. The first consideration should be applications software, then the personal computer hardware that best supports them. Selection of applications and personal computers narrows the choice to a limited number of networks. Over time, this sequence may be reversed, as compatibility on all levels of the ISO model becomes common.

Conclusion: In general, users are not interested in local networks until they have had some experience using individual workstations. Thus, the initial focus should be on the installation and applications of personal computers. As personal computers become widely installed, small clusters of networks will evolve. A rigidly structured, top-down approach engenders resistance. Instead, the networks of personal computers should be tailored to the business problems of each user. Only by implementing networks in response to user needs will the full potential of local computer networks be realized. ‡ OA

Metcalfe is chairman of 3Com Corp. of Mountain View, Calif., and was instrumental in the creation of Ethernet.

Meyer, of N. Dean Meyer and Associates, Inc., Ridgefield, Conn., specializes in advanced OA consulting.

The Future — Or the Shock?

BY GLENN RIFKIN

Being part of the world's largest corporation hasn't guaranteed success for Exxon Office Systems Co. (EOS) in the OA market. On the other hand, it hasn't hurt.

In the case of EOS, the connection to Exxon Corp. has been nothing less than a lifeline to survival. Established in 1981 as a division of Exxon Enterprises (Exxon's business development arm), EOS has had a troubled tenure.

The division, which is a consolidation of Exxon's Qwip, Qyx and Vydec office product ventures, has been awash in red ink since its inception and there is little indication the tide will turn soon. Divisions of Exxon do not publicly reveal their revenue figures. Although industry analysts estimated revenues in the $200 million range for 1983, some insiders claim a more accurate figure would be $130 million with losses of $75 million or higher. Losses for 1984 may fall in the same range, sources estimated.

Douglas V. Brunson, senior vice-president of marketing for EOS, denied losses reached that level in '83, and said, "We are making good progress toward profitability."

How near EOS actually is to the break-even mark remains Exxon's secret. What the $100 billion oil giant will state publicly is its continued commitment to the viability of EOS, and that is perhaps more important to potential customers than recent earnings. According to Thomas Billadeau, president of Office Systems Consulting Group, Inc., Exxon Enterprises has historically "not cut anybody off. If the corporation believes EOS is meeting its objectives, there's no reason to think they won't have at least five more years to reach profitability."

GREG WENZEL

"It is worth stressing that Exxon did not make investments in these areas with quick payouts in mind," Exxon Chairman C.C. Garvin, Jr. wrote in an October 1983 letter to shareholders. "Successful diversification requires not only the foresight to identify future markets with good potential, but the financial strength to permit opportunities to mature."

"They're behind us for the long haul. They recognize that when you enter an industry that has great growth potential and is the future of the 21st century, you don't go in for just four or five years."

Robert A. Contino, president of EOS

For Robert A. Contino, president of EOS, this vote of confidence has eased the pressure from his own difficult task. "They're behind us for the long haul. They recognize that when you enter an industry that has great growth potential and is the future of the 21st century, you don't go in for just four or five years," he said.

Of course, not even a colossus like Exxon Corp. can ignore huge losses forever. Industry analysts agree that a venture such as EOS would have succumbed long ago if it hadn't had its parent pumping in the cash. "They couldn't sustain these losses without a sugar daddy," said Hilde Uhler, associate editor for The Seybold Consulting Group, Inc. in Atlanta.

For Contino and his IBM-alumni-oriented management team, it has been a difficult three-and-a-half years. When EOS was formed, Contino had to restructure and refocus organizational strategies from at least three separate stand-alone entities to create a single office systems company.

Many of the talented entrepreneurs who had run those companies wanted no part of the corporate bureacracy of Exxon and left. The product lines, incompatible and aging, had to be replaced with fresh, leading-edge offerings in order to make EOS a viable alternative in a fast-moving, technology-driven market.

In 1982, a spate of negative publicity amid reports of heavy losses hurt potential EOS sales even more, and the trade press was writing an obituary for the new division.

Despite that death knell, EOS has managed to live on. Contino has made major changes, cutting the organization's staff in half (to about 2,600) and slicing down overhead and other major costs. Depending on who is talking, the prognosis for the future varies. Some consultants view EOS as a solid second-tier contender in the OA market. Others, unimpressed with the current product line, believe that, to be an office vendor at all, the company may have to settle for a niche market, such as ink jet printers or facsimile machines.

For his part, Contino has no intention of settling for a niche market. Exxon Corp. is looking for a solid foothold in the information processing business as a hedge against the declining fossil fuel market of the future, he pointed out, "and making ink jet printers isn't going to get us there."

Instead, EOS has adopted a strategy of "accommodation and integration." With a target market of Fortune 1500 accounts, EOS intends to acknowledge a company's installed base and fit its systems into that environment. "We may not be as big as the IBMs, DECs and Wangs, but we've built our product line in response to true market requirements," Contino said.

"We think the way to be a solid second-tier vendor, big enough to be very significant selling generalized — not niche — products, is to be accommodating," explained Al Bentley, EOS' vice-president of product marketing. "We admit IBM is there, so we develop interfaces to their data streams — maybe to their PC — and work with their local-area network strategies as they unfold. This way, a customer can buy a very-easy-to-install product from us, yet it can fit in with what they are already doing."

To meet this end, EOS has brought out a product line that, according to Contino, addresses the integrated kinds of tasks and applications most important in the office. The key products in that line are the 500 Series secretarial workstation, the Unix-based 8400 Series cluster controller, the 965 Ink Jet Printer, and the yet to be delivered 750 Professional Workstation.

Though EOS also markets an intelligent typewriter and the Qwip facsimile machines, it is counting on its workstations and controller to make it a serious contender in the OA battle.

"The uniqueness of our products is that they all work together," Contino boasted. "People might want stand-alone products, or in some cases want two or more products to work together. You can buy one or two products from us and later link them all together, and that's a level of integration that is unique. Granted, everybody uses the word integration, but how integrated is it?"

Unfortunately for Exxon, this same question has been asked about its product line; thus far, the answer has not made a very favorable impression. The 500 Series secretarial workstation (developed for EOS by Compucorp, Inc.) is considered a well-priced (starting at $5,000), low-level word processor.

In contrast, the 8400 cluster controller has been called overpriced and has run into numerous problems. Marty Gruhn, of the Sierra Group, Inc., commented, "It remains to be seen how much the 8400 applications are truly integrated."

Last winter, according to Exxon's Brunson, the system experienced lockups due to electrostatic charges. Though that glitch has reportedly been resolved, the second release of software for the 8400 has been delayed until the fourth quarter of this year. Brunson said EOS has shipped 200 of the 8400 controllers thus far, a figure 30% to 40% below quota.

Several of the company's 85 independent sales agents have expressed dissatisfaction with the system. "I've had no technical problems with the 8400," said John Adams, of Inland Empire Business Information Systems in Spokane, Wash. "But the system is just too expensive. For $35,000 you get only the controller and three terminals, and it's a difficult sell."

"You need added value for a controller to be worthwhile," added Billadeau. "Exxon says the 8400 allows you to tie together Series 500 word processors. Big deal. People won't pay for that. The only reason they've placed any at all is because it's Unix-based. Unfortunately, the Unix version they're using is not industry standard."

The 750 Professional Workstation, which Exxon has been advertising heavily, has also run into delays and isn't scheduled for shipping until the fourth quarter. Priced at nearly $8,000, the 750 is currently a stand-alone unit based on the Z8000 chip from Zilog, Inc., a sister division of EOS.

According to Bentley, the 750 will be attachable to the 8400 with shared files and communications later this year. The 750, he pointed out, is a multitasking, multiwindow workstation that has the Series 500 capabilities built directly into it via a Zilog Z80 chip. This allows identical keyboard and WP interfaces between the 500 and 750.

Analysts and dealers, however, are taking a "wait and see" attitude with the 750. If it can do what EOS claims, they might have a salable product, Uhler said.

Adams, EOS' No. 1 independent sales agent for 1983, is skeptical, however, about its potential. "Head to head against the IBM PC, there's no way we'd get the sale. It's not priced that competitively, and the only way to sell it will be to existing accounts."

Cliff Lindsey, vice-president of Dataquest, Inc. consulting firm, added that the 750 looks good "as a niche product," perhaps for small, independent businesses that need professional computing.

Glaring by its absence on the 750 is IBM PC-compatibility, which Billadeau called "absolutely illogical." EOS does plan to outfit the 750 later this year with an optional 8088 MS-DOS board, which reportedly will allow one of the windows to call up PC files. Also confounding to analysts is EOS' unwillingness to integrate the IBM PC onto the 8400. Contino explained that EOS wants to sell its own workstations for the system, but Uhler pointed out that

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"this cuts them out of an entire market."

Ironically, the ink jet printer, a fast, quiet and flexible unit developed internally, is the product that draws the best reviews. Among its better options is a character set that prints out chemical symbols. Marty Gruhn calls the ink jet printer "the flagship" of the EOS product line.

"It's inexpensive [$4,400] and very flexible," Gruhn stated. "It is a strong product across vertical markets. It makes their whole line more attractive."

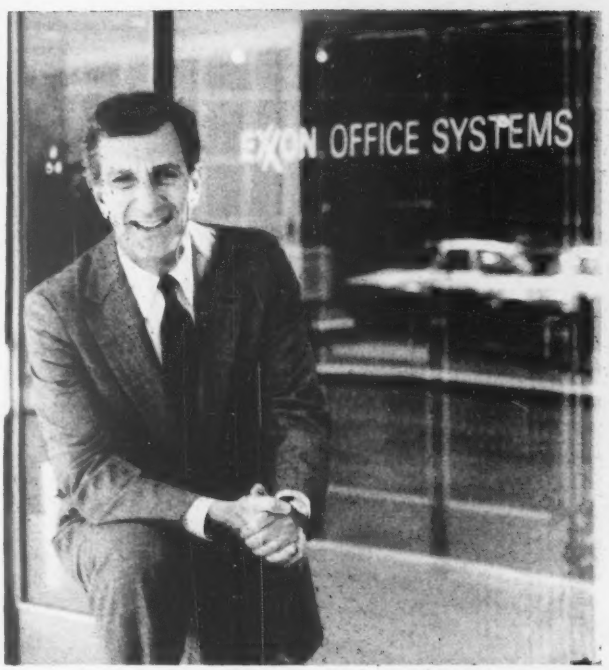
Like the 750, however, the ink jet printer does not attach to the 8400 as yet. Brunson said that interface would be available in October.

According to Contino, EOS is already looking to the future with plans for a family of workstations around the 750 architecture. He also predicted the opening of Exxon's version of Unix so it can be used with both data and text processing application packages. But before EOS can worry about the long term, it must solve its short-term woes.

Perhaps the most critical stumbling block for EOS has been in software development, where numerous delays and snags have occurred throughout virtually the entire product line. The company has a 400-member research and development group, two-thirds of whom are involved in software development at EOS' Princeton facility.

The software team, which one consultant called "inept," has been plagued by attrition. Brunson acknowledged that the group is 10% understaffed; he blamed the defections on the hot market for Unix developers.

Despite EOS' somewhat frenetic entrance into the market, Billadeau is cautiously optimistic about the division's chances. The accommodation theme, he said, is "a smart concept" and could make Exxon a solid second-tier vendor.



"We've really just started," Bentley said. "It's a base. The key to making a name for ourselves is to complete the integration and accommodation. That requires a lot more communication than we already have. Local-area networks and PBXs need to be more than good plans; they need to be there. Beyond that, there needs to be a lot more function." Among the critical areas of accommodation are IBM PC-compatibility; IBM's Disoss-compatibility; Wang Laboratories, Inc. document exchange; and interfaces to such protocols as IBM's DCA and DIA.

The 2780 and 3780 bisynch interfaces, announced in March 1983, have experienced delays and are due out in the fourth quarter. Contino indicated that a local-area network offering would be announced before the end of the year, and a PBX would follow. EOS is reportedly talking with both AT&T and Intecom, Inc. about PBX products and working with Zilog on an Ethernet-based local-area network.

EOS' dilemma is fulfilling those requirements before the window of opportunity closes. As one EOS sales agent put it, it is difficult to sell on announced specs; a product must be working and deliverable to translate into sales dollars. Among the major obstacles to creating a versatile product line, some consultants believe, is the pressure EOS feels from Exxon Corp. to work with Zilog.

In spite of Brunson's statement that EOS is free to seek appropriate technology elsewhere, the company is still concentrating most of its efforts with its sister division. "They can go outside Zilog, but they must give adequate justification for it," said Billadeau. "It's difficult to have leading-edge products that way. I'm not sure the Z8000 on the 750, for example, is the optimum solution."

Although it is clear the EOS product line is a long way from polished, EOS may have two key ingredients that provide staying power. The name Exxon, according to Contino, lends quality and stability to the company's image. And, consultants agreed, the management team under Contino — mostly former IBM Office Products Division personnel — has displayed marked improvement setting up a strong organization.

"They've lived through the fire," Gruhn stated. "Contino has turned things around, and there is a sense of mature management, which is an important component of success."

"I sense that things are better than they were two years ago," Seybold's Uhler said. "The organization must be good because the products aren't," added Billadeau.

EOS, though supportive of its product line, agreed that technology is not the driving force behind office sales. "We are targeting Fortune 1500-type companies, and their major buying criteria are service and support and the stability of the vendor," Brunson said. "The larger customers are picking a company to do business with, not just looking for a piece of hardware. It's nice to be able to lead with Exxon."

Unfortunately for EOS, Exxon may still be just an oil company to most savvy management information systems directors. Those who know, according to Gruhn, remember how EOS has faltered over the last three years.

Gruhn is also skeptical about EOS' stated target market. "Everybody thinks their market is the Fortune 1500," she stated. "Targeting that is just a ridiculous catch phrase. They don't have the sales force or strategy to attack the MIS department in a large company."

Rather, she said, EOS should concentrate on the second tier — the medium-size to small businesses or the individual departments within large companies — where it can push business word processing. Competing against such vendors as NBI, Inc., CPT Corp., Compucorp and Philips Information Systems, Inc., EOS can find a good source of potential business on that level, especially in organizations where the OA strategy is being implemented from the bottom up.

In fact, though EOS has had some success with commercial accounts, a good portion of its sales — more than 40% — have been low-bid government contracts and to Exxon Corp. itself. Brunson pointed out that only 10% of the business is going to the parent company, but some industry watchers indicated that there is internal pressure within Exxon Corp. to use EOS equipment.

For the branch offices and the independent agents, the bottom line concern is simple enough: having a viable product line to sell. EOS has reportedly lost more sales agents than it has gained over the past year and several former agents expressed dissatisfaction with EOS's ability to deliver on its promises. "No product they've announced has been workable within a year of the announcement date," said one former agent who wished to remain anonymous.

"It's been a tough sell," said Bob Shiverdecker, owner of Systemark, Inc. in Tampa, Fla. "Things are better than before, but they're at a pivotal point right now. If those products come in as EOS has promised, they could be in a good position. But can they get it done quickly enough?" OA

Rifkin is senior writer at Computerworld OA.

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Fear and Loathing on the Micro Trail

BY JOHN D. SPINETTO

It would be difficult today to find a business that either does not own a microcomputer or has not at least thought about acquiring one. As the cost of these "personal" computers continues to decrease and as more software applications find their way to the marketplace, we can expect this trend to continue.

Technological evolution — including microcomputers — has been characterized as having four stages: fear, ecstasy, disillusionment and, eventually, cold reality. We are currently experiencing the second stage, ecstasy. Many potential users have overcome their previous fear of the micro. Buoyed by the reported achievements of friends and associates, these users have jumped onto the bandwagon and are now among those who laud the merits of microcomputer technology.

Forecasting a coming stage of disillusionment is difficult during a period of ecstasy, especially for one who is an avid supporter of microcomputer technology. Let me say, therefore, that the purpose of this article is not to forecast 10 years of disillusionment. Its intent is to point out recent observations which, if permitted to continue, will definitely lead to disillusionment, frustration and rejection. Although some disillusionment will most likely occur, it need not be severe, nor need it be accompanied by financial loss, higher costs and lost opportunities.

With this in mind, let's look at what businesses are not doing with microcomputers — but should be.

Planning: If any one lesson was learned over and over by DP departments during the previous two decades, it was the need for planning.

The most critical component of the planning process was defining the user's requirements. Those who took shortcuts to bypass this phase suffered the consequences: high software maintenance costs, increased backlogs in DP and frustrated users.

The same lesson is about to be repeated for microcomputers.

Here are a few illustrations:

• ***The low cost of micros normally results in acquisition authority being passed to the level of the department or lower.***

Although this often provides good short-term solutions for the department, it also creates long-term problems for interdepartmental communications and sharing of data and software. The advantages of volume-purchase agreements, which reduce costs to the company, are often lost. Valuable user assistance provided to volume-purchase agreement customers is also lost.

• ***User requirements definition is often limited to a statement on the benefits of electronic spreadsheets.***

A true requirements definition could have indicated a multitude of requirements, of which only a small percentage could be satisfied by the electronic spreadsheet. It's surprising the number of times departments acquire several microcomputers when a cluster of terminals sharing a larger processor would have been not only less expensive but also more productive for the users.

Piecemeal requirements definition will eventually lead to potentially costly networks, which represent a series of patches and Band-Aids that results when users discover they should have asked for something else. According to a recent report by the Gartner Group, Inc., the total cost for a full micro link to a mainframe — including the cost of the micro, shared peripherals, data communications hardware, local-area network connection, shared gateway and applications software — can exceed $20,000.

• ***DP departments often are left out when planning efforts are undertaken.***

Sometimes this occurs because DP "doesn't want to be involved" with microcomputer, word processing and other office-related automation. Other times, management "doesn't want DP slowing up the process." In some cases, the real appeal of a micro is the ability to bypass the DP department.

In either case, companies are not taking advantage of the valuable experience and knowledge of DP departments, whose advice will be appreciated later — at a much higher cost to the company.

Security: Computer security has been overpublicized in recent months. Electronic snooping of computer whiz kids into corporate and government data bases has attracted the attention of an over-zealous press. In several cases, both the degree of the security break and the role of the computer have been greatly exaggerated.

If the media's fascination with the subject has had any benefit, it may be that of focusing management's attention on the micro environment. Many companies lack a strong policy statement for microcomputer security, a good program of education and training to promulgate the policy and a series of checks and balances to monitor its implementation.

The attraction of the microcomputer can cause users to become overinvolved in the computer process rather than in the computer output.

A microcomputer security policy should address the following topics:

☐ Physical security requirements and responsibilities, especially for portable micros.

☐ Portable computer checkout procedures.

☐ Use of personally owned micros and software in the office.

☐ Data security requirements and responsibilities, such as access restrictions, backup policies and classification and storage of diskettes.

☐ Software security requirements and responsibilities: for example, access control, backup copies, copy control and copyright policy for in-house software.

Users and supervisors must understand the issue that is central to the use of micros: accepting the capabilities of a microcomputer means also accepting responsibility for the respective hardware, software and data. They also should be informed about what that responsibility includes.

Control is an unpopular term in 1984 because, unfortunately, it conjurs up thoughts of an Orwellian society. Control requirements for micros are considerably less severe, but they are almost totally neglected by many companies.

The use of the term "personal" with microcomputers has sent the wrong message to some users. Absence of control can lead to potential harm in the form of lost opportunities and additional costs incurred for a company. The following are a few examples of where control isn't, but should be:

• ***Applications developed by users.*** How many business associates have you met who profess to have "a real microcomputer guru" who is "doing great things" with their microcomputers? What would the impact be if the guru left tomorrow? Absence of programming standards, documentation policies and so on will cause utter turmoil in such a business when the guru leaves. Among the losses that would result are the knowledge of what software was developed, how it was tested and what it does.

The argument against control of this area is that such control stymies creativity. The argument for it may be the future of your business.

• ***In the absence of some control, $50,000 financial analysts can easily become $25,000 Basic programmers.*** The attraction of the microcomputer can cause users to become overinvolved in the computer process rather than in the computer output.

Experimentation has its value, but, uncontrolled, it can detract from the job the individual was hired to do. When your financial analyst spends more time writing and debugging Basic programs than analyzing financial data, you have a control problem.

• ***The number of data base management systems marketed for microcomputers, coupled with the trend toward downloading data bases from mainframes to micros, points to an obvious need for data control.***

In the absence of control, two independent electronic spreadsheet analyses could easily produce conflicting results. The greater the number of data bases created, the greater the chance they will not agree.

Education and training: The effectiveness of a company's education and training efforts in microcomputers can normally be determined by visiting two departments — one with a microcomputer and one without.

In the department with the micro, determine who should be using it, who is using it and how it is being used. In most cases, absence of training is the principal reason why many potential users are not using the computer or specific applications. It is difficult to rationalize spending $5,000 for a microcomputer, but refusing to spend $100 for training an operator.

In the department that does not have a computer, conduct a brief analysis of the potential need. If a need appears to exist, determine what effort has been made to justify the micro.

If "Nothing," or "We didn't know a microcomputer could do that," are among the responses, you may have an education problem. Although other factors could be contributing to the problem, education and training are often neglected, even though they are two of the most important factors for effective implementation of microcomputer technology.

Policies are closely aligned with control and may be instituted at various levels within an organization. They are typically created to establish standard procedures and to outline responsibilities in areas important to the company, division or department. Security policies were discussed earlier. The following are some other areas for which policies should be established for microcomputers, but frequently are not:

☐ Hardware maintenance: Multiple maintenance contracts are rarely cost-effective.

Employee curiosity and tampering have proven to be the quickest method for invalidating warranties. Dirty printers, disk drives and diskettes can result in lost data. The cost to the company depends on the significance of the data.

☐ Software development: DP programmers build controls into their software applications. In addition, they have learned the value of error, warning and exception lists; testing; and reconciling output.

The novice microcomputer user programming in Basic has little if any appreciation for these controls. Users who program on micros will habitually develop unique solutions that address very narrow needs. DP programmers will develop more general solutions, which can be used by more than one individual.

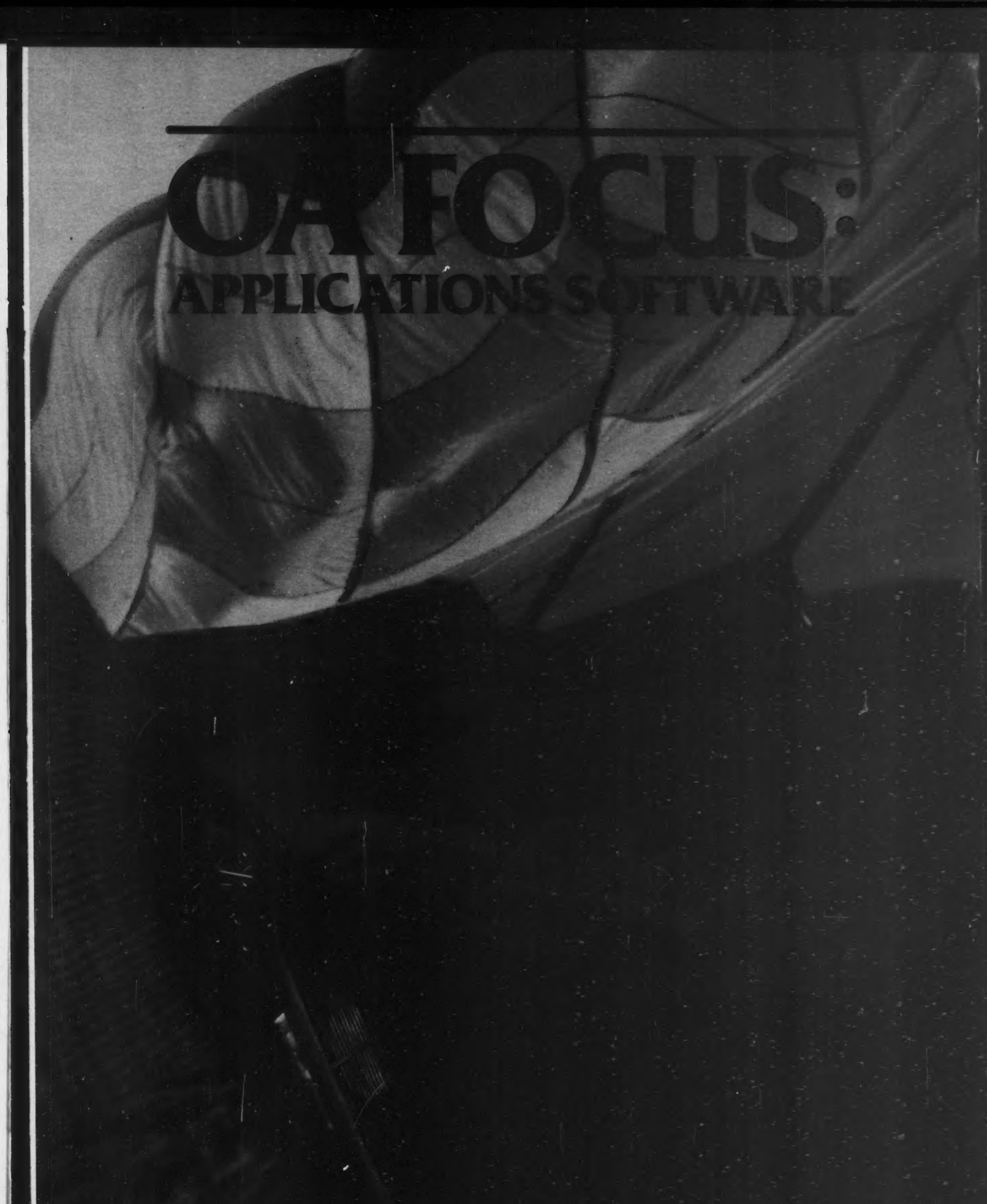
General guidelines for microcomputer users and programmers can significantly increase the value of the company's investment and the user's product.

☐ Software acquisition. Policies for software acquisition must consider issues such as mainframe vs. microcomputer use, compatibility with previous acquisitions, communications, source code vs. object code, enhancements, training and modifications.

Keep in mind that a micro is a valuable tool for performing a million calculations, but it is a potential burden when sorting a thousand records. Transaction-driven systems are normally appropriate for minis and mainframes. Don't make the mistake of trying to pull a house trailer with a Volkswagen — it only works for a little while.

Each organization has a unique environment that will influence its employment of microcomputer technology. This article is an attempt to point out areas of neglect in microcomputer implementations in a variety of environments. It does not address all the policies that should be implemented or all the steps that should be taken in integrating microcomputers into a business.

Spinetto is a supervisor with Ernst & Whinney in Birmingham, Ala., and provides office automation consulting to the firm's clients in the Southeast.



OA FOCUS:
APPLICATIONS SOFTWARE

The demand for good application software is on the rise. Users, however, are still confused by the various software offerings and find it difficult to know which packages will best fit their needs.

This Focus section covers some of the major topics in application software and explains what they do and don't offer.

Information Center Software 29
Electronic Mail 35
WP Software on Personal Computers 39
Integrated Multifunction Software 41

Hot air balloon, courtesy Terry Mulryan, Amherst Advertising. All photographs in this section © 1984 by John Owens.

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Its full 17" bit-mapped screen lets you view two full pages simultaneously and open up to six documents at a time without covering up a previous document.

It's also the only workstation that can create and print documents in more than a dozen languages, including Russian and, for the first time, Japanese (Katakana, Hiragana and Kanji).

While other workstations may use Xerox innovations like the mouse, icons, windows, property sheets and combined text and graphics, the Star simply does more with them.

For example, the Star's extensive software is fully integrated, to allow you to work with text and graphics simultaneously. You can draw a flowchart right in the middle of a full page of text without having to resort to a separate program and limited buffer "scratchpad" or "clipboard."

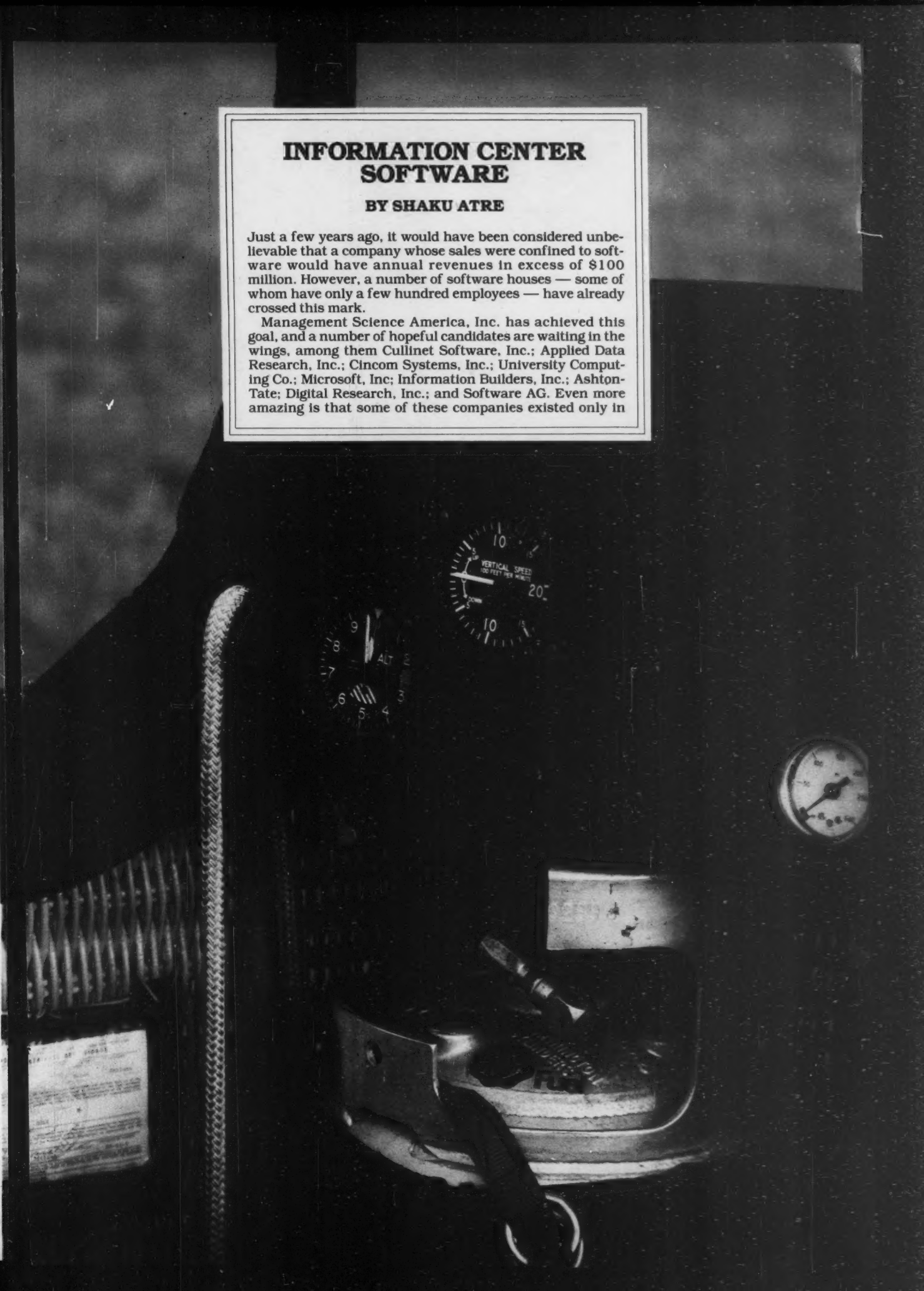
In terms of capabilities, ease of use and overall value, the Star would have to be considered the stellar workstation in the industry.

INFORMATION CENTER SOFTWARE

BY SHAKU ATRE

Just a few years ago, it would have been considered unbelievable that a company whose sales were confined to software would have annual revenues in excess of $100 million. However, a number of software houses — some of whom have only a few hundred employees — have already crossed this mark.

Management Science America, Inc. has achieved this goal, and a number of hopeful candidates are waiting in the wings, among them Cullinet Software, Inc.; Applied Data Research, Inc.; Cincom Systems, Inc.; University Computing Co.; Microsoft, Inc; Information Builders, Inc.; Ashton-Tate; Digital Research, Inc.; and Software AG. Even more amazing is that some of these companies existed only in



Information Systems:
- Mainframe computer providing transaction processing, 'bread and butter' applications for the organization.

Office Systems:
- Electronic mail, electronic filing, document sharing and local-area network.

Workstation:
- Personal computer.
- Remote data access (downloading, uploading).
- Numerical analysis (spreadsheet).
- Sort, search of data (data base management).
- Memo and report writing (WP).
- Business graphics.
- Electronic mail.
- Project schedules.

Figure 1. Software, Hardware Systems Levels

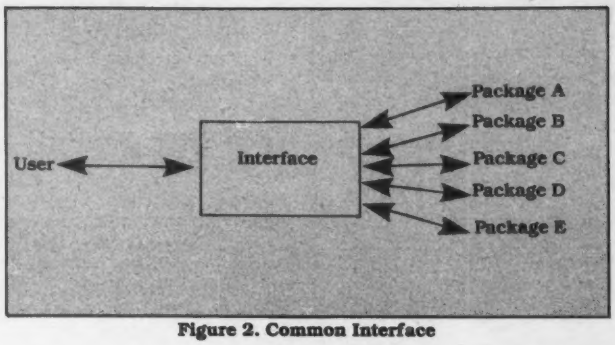


Figure 2. Common Interface

the imagination of some entrepreneurs only a few years ago.

Software has tipped the scale. In 1983, the average software expenditure for a Fortune 1000 company was as follows:

- For mainframes $326,000
- For minis 104,000
- For micros 26,000

What's even more astonishing is that in 1984 the revenue of software sales and maintenance is projected to be close to $10 billion.

The other side of the coin is that as this explosion continues, software selection will become increasingly more difficult for companies that have not done strategic planning or that are not putting their plans into practice.

Some software companies have entered the limelight because they are offering software for the microcomputer industry. Among the front-runners are Digital Research, Microsoft and Ashton-Tate.

In turn, the microcomputer industry has brought end-user computing to life, and end-user computing is the cornerstone of the information center.

The information center, a consulting and service facility within an organization, enables users to access their data. Because the information center is an integral part of the DP organization, the software selection process encompasses more than just the software used directly by the end users. The software that is installed on the mainframes in the DP department and that will enable end users to access corporate data must also be considered in the selection process. Figure 1 lists the three levels of software and hardware systems needed in an information center.

Among the major responsibilities of the information center's staff are the evaluation and selection of the most appropriate software packages and the development of a common interface. The interface should be a menu-based system so users don't have to learn five or six sets of mnemonics (see Figure 2). The staff also has to be able to teach the end users to use the information center software.

DP management, together with the information center staff, has to go through a rigorous software selection process for the information center. Plans for software selection have to be made for each of two major classes, mainframe and "others."

The mainframe class includes the conventional IBM 4300 and up; the Sperry Corp. 1180 and up; Honeywell, Inc. DPS 8/70 and up; Burroughs Corp. 7900; the superminis of Digital Equipment Corp. VAX-780 and up; and AT&T's

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3B20S and 3B20D. The "other" class is composed of the mini, supermicro, micro and personal computers used in the office environment: AT&T's 3B2 and 3B5; Data General's MV/10000; DEC's VAX-730; IBM's S/23, S/36 and S/38; IBM's PC, PC/XT, XT/370 and PC/3270; Apple's Macintosh and Lisa; and DEC's Rainbow and Professional — just to name a few. About 500 types of microcomputers are available in the marketplace today!

A software package for the mainframe and supermini class can be classified as an application, a utility or a specialty product.

End-users are involved with the input and output of the application packages — for example, the accounting department and sales staff are directly involved with accounts receivables, general ledger and sales tracking.

Some of the specialty packages — data base management systems, for example — also need end-user involvement. But the utility packages — such as dump/restore and performance monitoring — need systems programming expertise.

Three types of companies can be considered for this software:

• **Software companies** market software products only and generally include object code, documentation and test data. Fewer and fewer companies are providing source code, but the buyer should make sure the source code is put in an escrow account before the contract is signed.

Installation assistance and training are usually available as a part of the price. Most software companies provide maintenance at 10% of the yearly cost of the purchase price. The software company's package usually runs on several brands of hardware.

• **Hardware/software companies** market hardware as well as software. The hardware company's package usually runs only on that company's hardware. Most hardware/software companies draw the lion's share of the revenue from hardware sales, not from software sales. The software sales are the means to the goal of selling hardware.

The trend is changing, however. A few years ago, IBM's revenues came 96% from hardware and only 4% from software. Just a couple of years ago, those figures had changed to 94% hardware and 6% software. It looks like IBM has discovered the software market — especially in the personal computer area. IBM intends to put more emphasis on software in upcoming years than it has in the past. Software sales normally include documentation and training. Maintenance usually costs extra.

• **Turnkey systems** provide complete development and installation of the package, including hardware selection. Some of these companies buy hardware and write software packages and sell the combination as value-added hardware.

It looks like IBM has discovered the software market — especially in the personal computer area. IBM intends to put more emphasis on software in upcoming years than it has in the past.

The steps involved in the selection process for software for the mainframe and supermini class can best be understood by tracing the selection of a data base management system (DBMS) as an example.

Typically, the selection of one package also involves the evaluation of other packages, somewhat along the lines of the domino principle. Selecting a DBMS usually involves evaluating or selecting not only the DBMS, but also a teleprocessing monitor, a data dictionary and a fourth-generation query language. Without these packages, the establishment of an information center would make little practical sense.

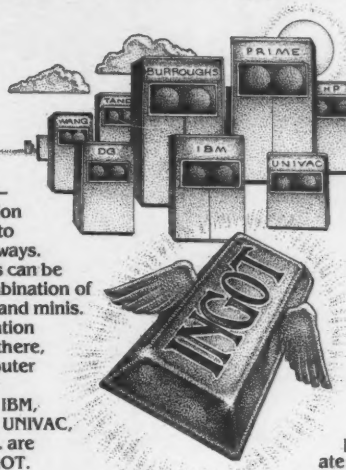
To select a DBMS, a seven-step approach could be followed (See Figure 3 on Page 34).

1. Identification of the need.
2. Elimination process (see Figure 4 on Page 34).
3. Preparation of request for proposal.
4. Response evaluation.
5. User meeting.
6. Final evaluation at the vendor's headquarters.
7. Recommendation.

Step 2 will eliminate packages that should be out of race. The

Distribute your creativity.

New INGOT makes decision support applications portable.



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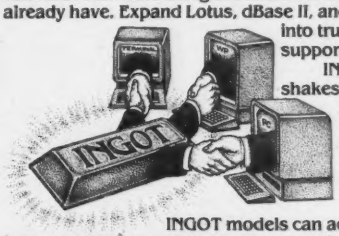

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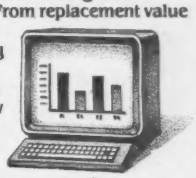

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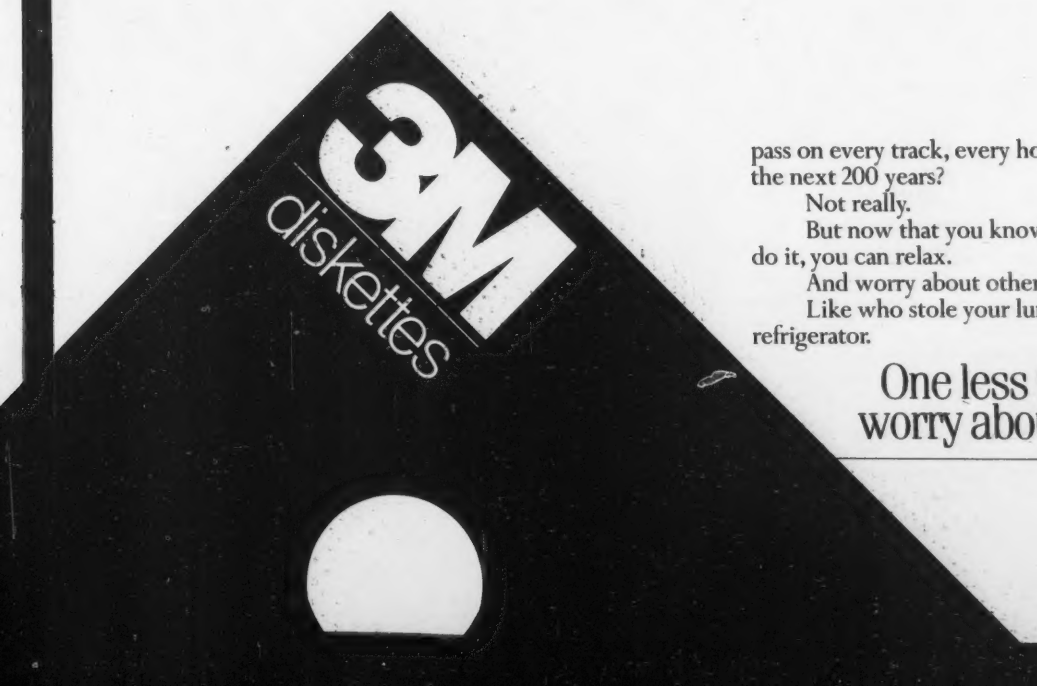
We even reject a floppy if its label is crooked.

Some people think we're a little crazy to go to all that trouble. After all, do you really need a diskette that can make one read/write

oduces thing to bout.



pass on every track, every hour, every day for the next 200 years?

Not really.

But now that you know a 3M floppy can do it, you can relax.

And worry about other things.

Like who stole your lunch from the office refrigerator.

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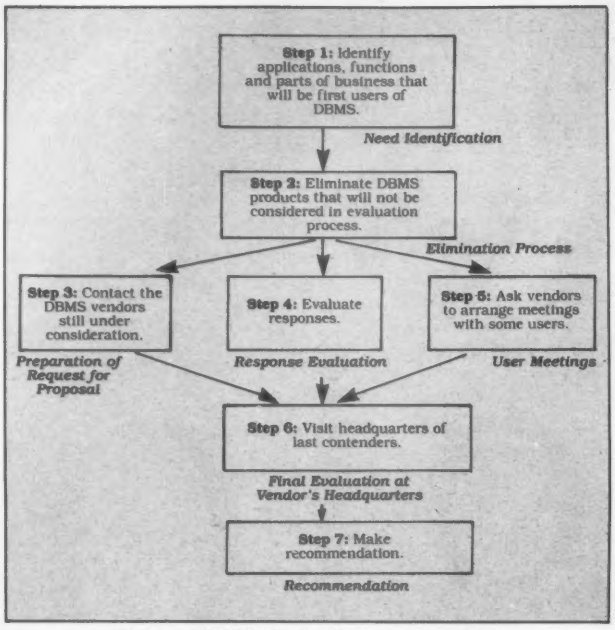

Step 1: Identify applications, functions and parts of business that will be first users of DBMS.
Need Identification
Step 2: Eliminate DBMS products that will not be considered in evaluation process.
Elimination Process
Step 3: Contact the DBMS vendors still under consideration.
Step 4: Evaluate responses.
Step 5: Ask vendors to arrange meetings with some users.
Preparation of Request for Proposal
Response Evaluation
User Meetings
Step 6: Visit headquarters of last contenders.
Final Evaluation at Vendor's Headquarters
Step 7: Make recommendation.
Recommendation

Figure 3. DBMS Evaluation and Selection

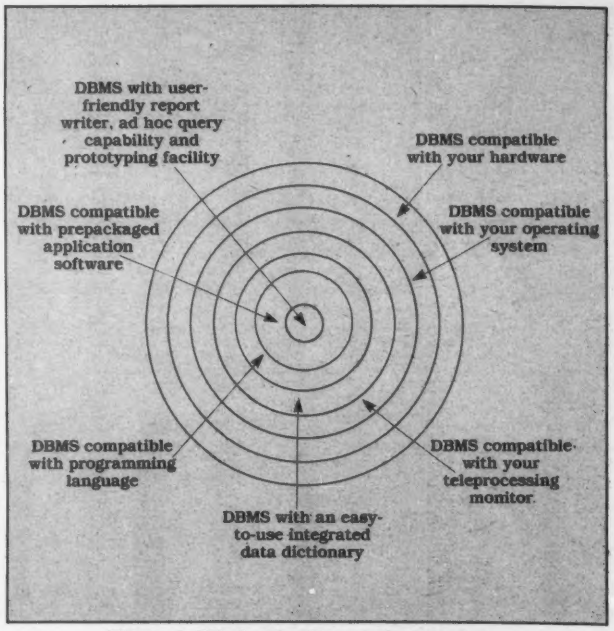

DBMS with user-friendly report writer, ad hoc query capability and prototyping facility
DBMS compatible with your hardware
DBMS compatible with prepackaged application software
DBMS compatible with your operating system
DBMS compatible with programming language
DBMS compatible with your teleprocessing monitor
DBMS with an easy-to-use integrated data dictionary

Figure 4. Elimination Process in Step Two.

DBMS products that remain should have the following characteristics:

- Compatibility with your hardware.
- Compatibility with your operating system (DOS/VSE, MVS, VM/370, for example).
- Compatibility with your teleprocessing monitor (such as CICS, Taskmaster).
- An easy-to-use integrated data dictionary (for example, IDD, Data Dictionary).
- Compatibility with the programming language used in your organization (Cobol, RPG II, Fortran, PL/1, assembler and so on).
- Compatibility with prepackaged application software used in the organization (such as payroll, accounts receivable and accounts payable).
- User-friendly report writer, ad hoc query capability prototyping facility (such as Focus or Ramis II.

The DBMS software with data dictionary and fourth-generation query language usually costs around one-third million dollars for one license. The major cost is not this third of a million, but the cost of time — time that the systems analysts, application programmers and systems programmers will spend analyzing various applications to be developed, developing the application programs and maintaining the DBMS as well as the applications created. The third of a million dollars is just the tip of the iceberg!

Some DP executives think they can change the DBMS vendor if it doesn't work the first time — not true! Conversion from any software package to another package is extremely time-consuming and, as a result, very expensive.

Software selection for the mainframe and supermini environment has to be taken very seriously. Two or three competent people from the staff may have to spend six months or so in the selection process.

The picture changes slightly as we move from the mainframe to the personal computer area. If tens of applications software packages are available for mainframes, hundreds are available for the personal computer. Most of these products cost between $200 and $1,000 per copy and these prices have created many "compulsive" buyers.

When many types of incompatible software packages are purchased, not only will the money be wasted, but a more serious situation will arise. These packages will become obsolete at different times and will require considerable amounts of training time. To avoid the chaos of proliferation, a corporate policy should be set for the acquisition of software for personal computers.

To help set strategic planning for personal computer software, seven applications should be offered to support managerial tasks: numerical analysis (electronic spreadsheets); sorting and searching data (data base management); memo and report writing (word processing); business graphics (graphics and statistical reporting); remote data access (downloading and uploading capabilities); electronic mail; and project management.

Some combination of these seven facilities is known as integration in the software world.

Today's personal computers are good for some things: consistency in response time; availability; portability (but sometimes only if you belong to an Olympic weightlifting team); ease of use (relative); calculations (number-crunching); low cost (sometimes illusive); control of your destiny; and competitive prices offered by mail order houses.

But today's hardware technology has some difficulties, and these are reflected in the software available, too. Among the drawbacks of the personal computer are the following:

- Moving large amounts of data (it could take one hour to fill the floppy diskette).
- Sorting thousands of records (it could take hours to sort a half million records).
- Transaction-driven systems (micros are still not the mainframe).
- Printing large amounts of data (unless you want to go deaf).
- Backup and recovery (this could result in big losses if not done periodically).
- Controlling proliferation of diversity (some companies are trying to cope with running the same piece of software on four or five different types of personal computers).
- Implementing security (floppy diskettes can walk away much faster than a 3380 device).

As a result of the incompatibilities in the personal computer area, software selection for microcomputers goes in an opposite direction from that of mainframe computers. The first step is identification of function to be performed; next comes selection of software, with specific consideration of ease of programming; and then comes identification of the hardware that will run the software.

As was the case with mainframes, the two categories of software for personal computers are systems software and application software.

A variety of systems software exists for microcomputers — CP/M-86, MS-DOS, PC-DOS and Unix. The applications software has the following categories:

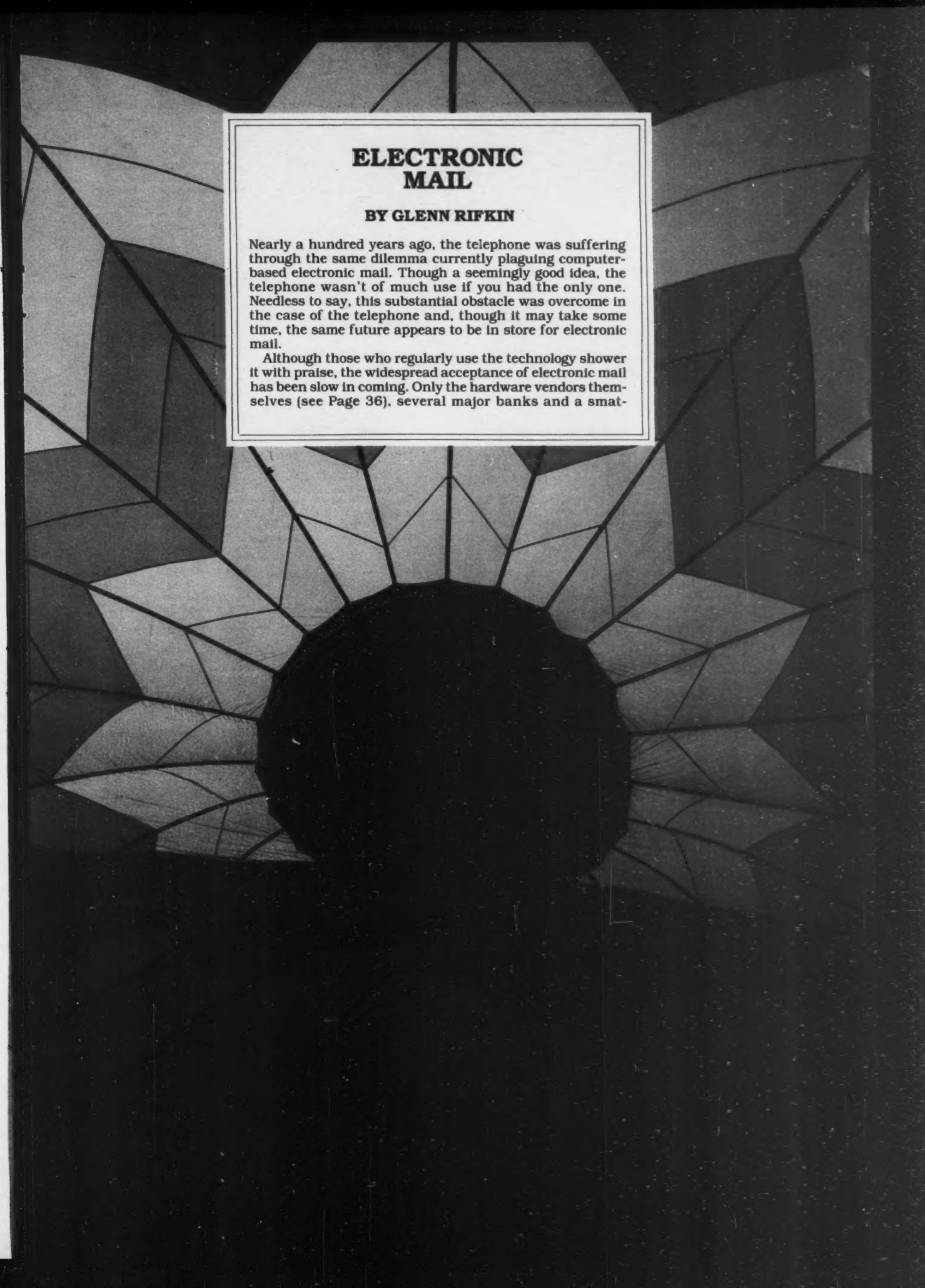
- Languages for building systems (such as Focus, Ramis II Mapper, Natural, Ideal, ADS/O and User-Language).
- Packages with which models can be built (APL, ADRS II, Lotus 1-2-3, Visicalc, Multiplan, Framework, Symphony and Dbase III).
- Statistical packages (SAS and APL Advanced Statistical Library).
- Financial analysis languages (Visicalc, Lotus 1-2-3, Multiplan and Plancode/I).
- Data selection packages (Focus, Ramis II, SQL/DS, DB2, Intellect, Easytrieve, Nomad 2, Access-204 and PC-204, Natural-Connection, Dbase III and Powerbase).
- Text processing and report writing packages (Focus, Ramis II, Nomad 2, Quick Query and Stairs).
- Graphics packages (for example, SAS-Graph and Tell-a-Graf).
- Decision support systems (IFPS, Empire, System W).

To be successful, the information center requires appropriate software on mainframe as well as on personal computers; as a result, the selection process is extremely challenging.

This process will be successful only if strategic planning adequately considers the functions to be served and the applications to be run. Otherwise, the organization will end up with a hodgepodge of hardware and software products that will be destined to failure.

A well-defined corporate plan and utilization of the right hardware and software products is the only way the promise of the information center can be kept.‡ CA

Atre is president of Atre International Consultants, Inc., in Rye, N.Y., specializing in data base disciplines, hardware and software planning, DP training and installation management.



ELECTRONIC MAIL

BY GLENN RIFKIN

Nearly a hundred years ago, the telephone was suffering through the same dilemma currently plaguing computer-based electronic mail. Though a seemingly good idea, the telephone wasn't of much use if you had the only one. Needless to say, this substantial obstacle was overcome in the case of the telephone and, though it may take some time, the same future appears to be in store for electronic mail.

Although those who regularly use the technology shower it with praise, the widespread acceptance of electronic mail has been slow in coming. Only the hardware vendors themselves (see Page 36), several major banks and a smat-

(Continued from Page 35)
tering of Fortune 500 giants have embraced computer-based messaging in a big way.

Other companies have taken the first tentative steps, mostly through the installation of office automation systems, but electronic mail in these places has yet to achieve widespread acceptance.

Nevertheless, electronic mail lovers should not despair. Industry consultants are bullish on the technology and are tossing around very impressive numbers about market potential. In fact, depending on who is talking, electronic mail may have already arrived.

Walter E. Ulrich, for example, a communications consultant and head of Walter E. Ulrich Consulting, Inc. in Houston, believes the electronic mail market is doubling every year and will become a 9-billion message market by the end of the decade.

Counting terminal-to-terminal messaging as well as physical delivery of computer-generated messages, that market may hit 18 billion messages by 1990 and explode to 60 billion pieces by 2000, according to Ulrich.

International Resource Development, Inc., a Norwalk, Conn., consulting firm, pointed out that in service revenues alone (not counting hardware) electronic mail will be a $180 million business in 1984 and may reach $5 billion by 1992.

According to a report by the International Data Corp. (IDC) in Framingham, Mass., the number of electronic mailboxes is growing at a rate of 68% annually, with expected increases from 225,000 in 1982 to more than 3 million in 1987.

A recent study by The Eastern Management Group added that by the end of 1983, 18% of all U.S. businesses used some form of computer-based electronic mail and another 20% was actively planning its implementation. The growing interest in the technology has, in fact, spawned the Electronic Mail Association (EMA), a Washington, D.C.-based trade group that views itself as a "voice for the industry."

Opinions vary as to what will ultimately bring about electronic mail's acceptance, but general agreement exists on two major driving forces. The influx of OA systems and personal computers has dramatically changed the pace of electronic mail use. Steve Caswell, editor of the newsletter "Electronic Mail and Message Systems" (EMMS), pointed out that electronic mail has become a secondary application in OA systems, but one that gets pulled along as a useful add-on.

Electronic mail lovers should not despair. Industry consultants are bullish on the technology and are tossing around very impressive numbers about market potential. In fact, depending on who is talking, electronic mail may have already arrived.

"Companies will pay to put workstations on desks for such things as text processing, data base management or financial analysis," Caswell said. "They then add electronic mail."

In the case of the telephone, use was predicated on having the instrument in reasonable proximity to a user's work space. The same holds true with electronic mail. As terminals and workstations appear on more and more desktops, the technology will expand. According to IDC, the attractiveness of electronic mail will increase with improvements in price/performance of components, particularly those that are communications-related. For those with mailboxes on extensive systems, electronic mail has gone beyond the bell and whistle stage. "Once you are put on a system, you have access to information and events you need to have," explained Michael F. Cavanaugh, president of the EMA. "After you use it for a while, you wouldn't think of using the phone for certain messages. It's a heck of lot better than playing telephone tag."

Computer-based electronic mail has served as an umbrella term for many technologies. Currently the technology is generally broken into four categories: service providers such as ITT/Dialcom, Geisco and MCI Communications Corp.'s MCI Mail; in-house devel-

(Continued on Page 38)

A Case Study: One User's Experiences

Though it is still untested in many of America's offices, electronic mail is already a venerable institution at Digital Equipment Corp., a company that has invested years of development in several major in-house systems.

The Maynard, Mass., computer vendor first dabbled with the technology internally as far back as 1961, when PDP-1 users could transmit messages back and forth. Of course, the system worked only if users at both ends were at their terminals during transmission, so the technology was neither practical nor cost-effective.

By the early 1970s, however, DEC's engineers had created an in-house mail network to help facilitate their work. The development, which became known as Engineering Net, was not intended as a commercial product; indeed, it was so unfriendly that only programming and engineering types could use it. Despite that unfriendliness, however the system quickly claimed 8,000 subscribers.

By 1978, that success had spurred the Laboratory Products Group — a medical systems division based in Marlboro, Mass. — to create another in-house mail system, called Electronic Mail Service (EMS). EMS was based on Arpanet, the packet-switching mail system sponsored by the Department of Defense's Advanced Research Project Agency. At the heart of the system are minicomputer nodes (PDP-11/70s), which support up to 1,000 users. "When we started, the product engineers didn't see any commercial value to the system at all," Pat Mullen, senior group manager of Digital Information Systems, said. "It was a home-brew done by in-house MIS people."

The system includes such office automation features as "filing cabinets," calendaring and tickler files, along with the basic mail functions. Because demand far exceeded subscription availability, a hard-copy terminal was placed in mail rooms around the company to allow EMS users to send mail to nonsubscribers. Those messages would be delivered in that day's interoffice mail.

A pilot project early in 1978 led to approval of a full-scale production service by 1979. EMS now has more than 8,000 subscribers hooked to 15 nodes, and gateways between the original Engineering Net and EMS were installed. It is difficult to judge cost savings (employee's terminals are used for more than just electronic mail), but a survey taken several years ago estimated savings of $1.5 million in telephone costs alone.

"EMS made mail junkies out of people," Mullen said. "It has facilitated upward communications. It has addressed both efficiency and effectiveness and reduced the information float. Top management has it now, and they would scream if we tried to take it away. It's changed the way we do our jobs."

"At first, people were afraid to try it because they'd never used a terminal before," added Margaret Passafiume, senior operations analyst for the company's Industrial Design group. "But once they tried it and saw how well it helped them communicate, it became a significant part of everyday work life. Mostly by word of mouth, its popularity spread and now it's a must."

In fact, popularity spread so fast that it became apparent that EMS was oversubscribed and not cost-effective enough to meet the growing demand. Three years ago, work was begun on a more powerful system called the Message Transport Service (MTS) network. The company has stopped the expansion of EMS and last year instituted an MTS pilot internally with 5,700 employees in 10 clusters both in the U.S. and abroad. The success of the pilot convinced DEC to phase out EMS and eventually have all electronic mail users on the MTS network.

Currently, more than 10,000 subscribers are on MTS and, along with those remaining on Engineering Net and EMS, DEC has more than 25,000 employees (sending an estimated 100,000 messages per day) on its electronic mail system. According to Mullen, another 20,000 are waiting for the chance to join.

Mullen pointed out that getting electronic mail off the ground was no easier for DEC than for any other user. The only advantage, he said, was the availibility of hardware at cost. Otherwise, it was "a cold start and we definitely stumbled a lot."

Both Mullen and Carl Strathmeyer, manager of technology assessment for corporate telecommunications, agreed on several key factors for the successful introduction and development of an in-house electronic mail network:

- A critical mass is necessary; enough people must be on the system to make it worthwhile.
- The best way to sell electronic mail is to get a senior person to use it and get behind it.
- Pick the right pilot group and give them one simple application "to get hooked on."
- Keep the technology simple and transparent to the end user. "First impressions are lasting impressions," Mullen explained. "Once you lose people, it's tough to get them back."
- Provide strong subscriber support. When the system is being used, Strathmeyer said, people expect it to work, much like the telephone. "You have to give the impression that 'we won't let you fail.' "
- Don't overburden the system. It chews up resources.
- The pilot must be highly visible. "If the manager of the pilot group can brag about how much more efficient his group is, others will want in on that," said Mullen.

G.R.

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

oped software; independent packaged software; and multifunction office systems.

The service providers, though credited as being pioneers in the market, have had a rocky time moving from time-sharing services into electronic mail. Such efforts as the ill-fated U.S. Postal Service's Electronic Computer-Originated Mail (Ecom) suffered a trying tenure (with losses totaling about $50 million) before the Post Office threw in the towel and put the service up for sale recently.

Private ventures such as MCI Mail have gotten off to slow starts, but others such as ITT/ Dialcom claim to have as many as 60,000 subscriber mailboxes. In fact, Federal Express Co. has just recently gotten into the electronic mail business with its Zapmail offering and is predicting a 1.5 billion message business by 1990.

Analysts believe that a melding of the public service providers with in-house electronic mail systems is the wave of the future. By providing access to mailboxes — both on an intracompany and intercompany basis as well as to individuals without mailboxes — the technology can effectively create blanket coverage and approach the ubiquity of the telephone.

Adding to this scenario is the rapidly approaching specter of standards in the electronic mail marketplace. The Message Handling Standard, cosponsored by the international standards body CCITT and the U.S. Commerce Department, appears to be a shoo-in for adoption this year. According to Caswell, every leading electronic mail supplier is supporting the adoption. With such standards in place, electronic mail will reap the same rewards accorded facsimile devices which adopted standards in the late 1970s. Those standards were a major boost to the use of facsimile devices and will undoubtedly have a similar effect on electronic mail.

Another lift to corporate acceptance has been the dramatic reduction in the cost of electronic mail. Five or six years ago, the cost of sending electronic mail messages ran as high as $4 per message, which made the technology a prohibitive luxury. Today, according to Ulrich, the average mail message has dropped to 86 cents per message and can be as low as five to seven cents per message on some in-house systems.

Five or six years ago, the cost of sending electronic mail messages ran as high as $4 per message, which made the technology a prohibitive luxury. Today, the average mail message has dropped to 86 cents per message and can be as low as five to seven cents per message on some in-house systems.

"It used to be quite an investment to get into electronic mail," stated Richard Coughenour, vice-president of Citibank, Inc. "Now, it is far less expensive and much more versatile."

"As the costs come down to the same level as a postage stamp, it will simply be bad business not to use electronic mail," Ulrich added.

The cost reduction of the technology may help to alleviate what has been a confusing snafu over cost-justification of electronic mail. As the IDC report stated, "While everyone agrees that achievements like the reduction of 'information float' [the amount of time information spends in transit between originator and recipient] are valuable, it is difficult to measure just how valuable. It appears that those organizations that have implemented large-scale electronic mail networks have simply held their breath, closed their accounting procedure manuals and jumped."

For those who have implemented electronic mail systems, the jump appears to have paid off handsomely. At Citibank, there are actually two major electronic mail systems. Easymail, developed internally by Coughenour on the bank's Tandem Computers, Inc. system, serves the entire New York City operation and has more than 1,100 users. In addition, the Citimail system, based on Computer Corp. of America's Comet offering and running on two Digital Equipment Corp. PDP/11s, serves the bank's international organization. Citimail claims to have 5,000 subscribers.

Though Easymail currently reaches just a fraction of its potential users, Coughenour is confident the system will continue to expand. The influx of personal computers, he pointed out, has driven the demands of electronic mail beyond messaging. He foresees the need for composition, document preparation and transfer and other more intelligent access to electronic mail. "Dumb terminal access won't satisfy users anymore," he predicted.

At neighboring Chase Manhattan Bank, Martin Goldman, vice-president in charge of Chase's Mailnet, oversees the worldwide electronic mail network. The system, which is based on Wang Laboratories, Inc.'s Mailway package, has more than 3,500 users and has grown by over 1,000 users just this year. More than 20,000 messages are transmitted monthly over the bank's international network.

"It will definitely become accepted," Goldman said. "The areas that use it heavily now have become reliant on it and the users themselves have created the demand."

Despite the success stories, electronic mail has a long way to go. According to IDC, several major obstacles to blanket acceptance of the technology remain, among them the following:

- Electronic mail requires terminals — an effective network requires all users to have a terminal, preferably located no further away than the telephone from where a user works. Outfitting everyone with terminals (or personal computers) can be expensive, but unless the terminal is as convenient to use as the telephone, the system will not be used.
- Electronic mail systems still require learning certain computer skills. These commands will have to be kept to a minimum because in competing with the telephone, electronic mail is going against a technology that has been familiar to even the most nontechnical of us from the time we were children.
- Electronic mail is still limited to short messages in most cases. There are many instances when longer documents need transmitting and, to be effective, electronic mail must be able to address this in a practical manner.
- Communications between different electronic mail systems is still very limited despite the coming standards. Until those standards are effectively in place, the drawback of incompatibility is severe.

Proponents of electronic mail are well aware of the drawbacks but remain undaunted. "There's still some missionary work to be done," Ulrich conceded, "but the barriers are beginning to break down."

The user base is growing by 50% to 100% per year, according to Caswell, and when standards for interconnection are in place it "will open a whole new world. I don't know how fast it will catch on . . . habits change slowly. But over a 10 to 20 year time frame, it may rival the telephone." OA

Rifkin is senior writer at Computerworld OA.

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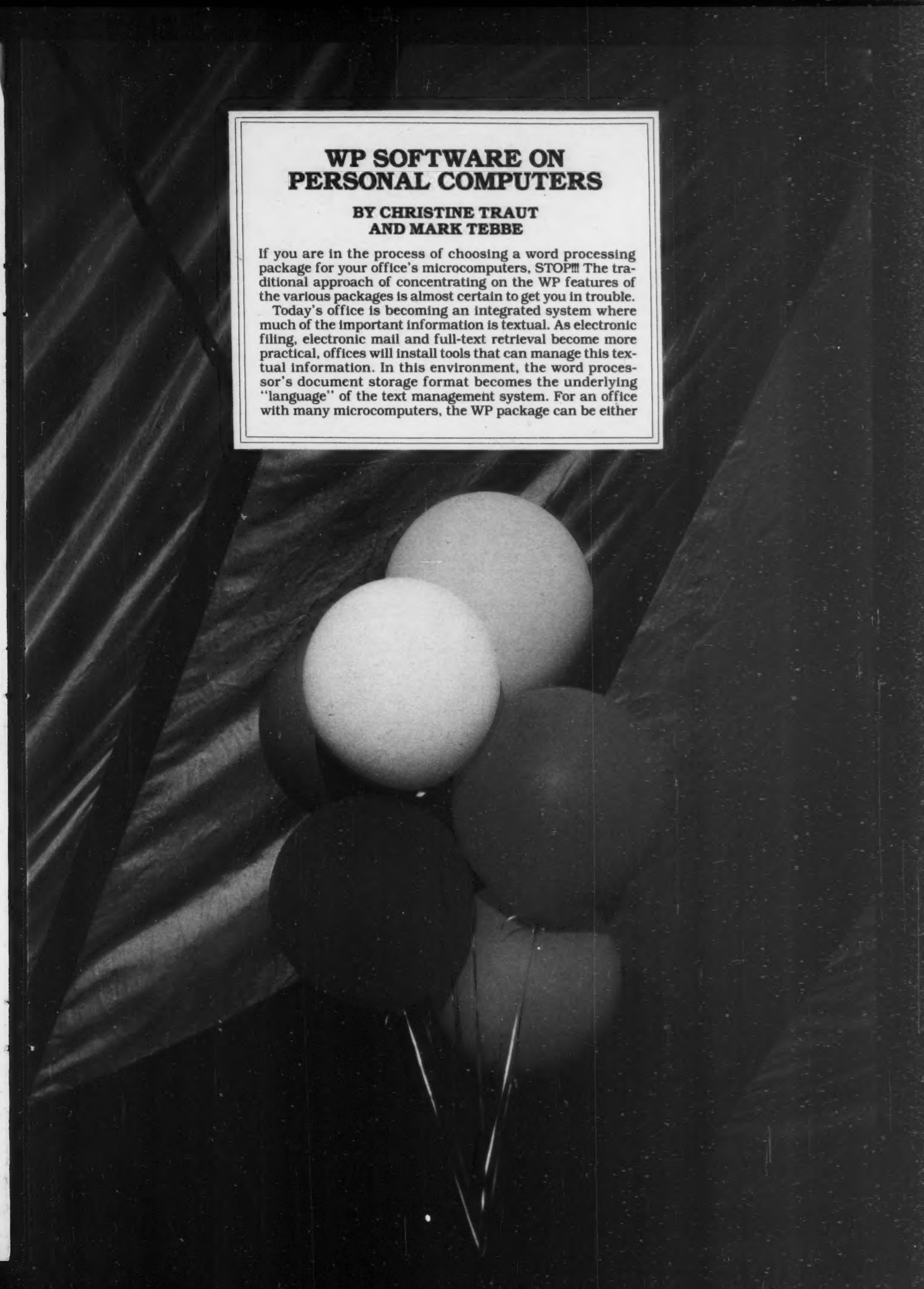

WP SOFTWARE ON PERSONAL COMPUTERS

BY CHRISTINE TRAUT AND MARK TEBBE

If you are in the process of choosing a word processing package for your office's microcomputers, STOP!!! The traditional approach of concentrating on the WP features of the various packages is almost certain to get you in trouble.

Today's office is becoming an integrated system where much of the important information is textual. As electronic filing, electronic mail and full-text retrieval become more practical, offices will install tools that can manage this textual information. In this environment, the word processor's document storage format becomes the underlying "language" of the text management system. For an office with many microcomputers, the WP package can be either

the glue that holds the computers together or the barrier that keeps them hopelessly isolated.

Many excellent WP packages are available for microcomputers, yet only a few work well as part of an integrated office system. Recent publication of document and coding standards by major office automation companies (such as IBM and Wang Laboratories, Inc.) should lead to more WP packages that work with integrated office systems. For the manager making a decision today, it is important to view WP within the context of the overall needs of the office and then to choose a package to meet those needs.

The single user can be characterized as a lone wolf. He owns a microcomputer with all the storage, printers and other peripherals he needs. Suppose he now decides to look for the best text-editing package. The lone wolf sees no need to coexist with anyone else's rough drafts. If he sends a document electronically, it is in final form, with no need to worry about further revisions.

The greatest challenge for our lone wolf is to sort through the many excellent WP packages for micros and to select the one with features that best match his own needs. This process can easily turn into a quest for a package with the ultimate footnoting or column handling (or whatever).

This pursuit of ideal functionality is largely irrelevant to the users of integrated systems. In fact, nothing is more hazardous in an integrated environment than a user who acts like a lone wolf.

System planners must strike compromises between the needs of individuals and the needs of the organization. Offices exist to allow people to work together toward a common purpose. Software that gets in the way of sharing work and information is inappropriate and dangerous in the office environment. Like the lone wolf, the system user needs a good text editor for producing documents. Beyond that, the system user needs to be able to move documents to other people and to get them to their destination in revisable form. The system user also wants to use other electronic workstations, printers, filing systems or disks within an office.

The day may come when many different WP packages can be neatly integrated into a systems environment, but it hasn't arrived yet. Meanwhile, when conflicts arise between the interests of the office as a whole and the lone wolf's desire for the best features, it is good to provide for the office's need to use and move information.

For many people, it is hard to prove that WP is a systems issue. If you look at it from the standpoint of how many keystrokes it takes to delete a word, you are probably right: It is not a systems issue. If you look around an office and notice how much critical information is in textual form and think of the ways in which that information needs to be managed, you begin to see the real issues.

Not too long ago, when WP could offer only automated typing, the impact of the software did not extend very far. In the past few years, office vendors have made great strides toward offering software that manages textual information.

Filing is one of the least glamorous but most crucial functions of text management in today's office. Unfortunately, most of the filed information is virtually impossible to retrieve in many organizations. People recreate, research and recompose letters or documents, unaware that identical work lies over in the next filing cabinet. In addition, filing cabinets take up very expensive space in many urban offices. It is difficult to justify today's square-footage rates for storing information that probably won't be used.

Electronic storage and retrieval systems range from those that require users or librarians to catalog the contents of a document to those with the ability to retrieve any item by doing a search of every word in every document. If, for example, you need the Johnson proposal that discussed short-term financing for tractors, the words "Johnson," "short-term" and "tractor" will retrieve all documents containing those words in seconds. Full-text search technology is not new, but economies of disk storage and processing power are making it more justifiable.

Electronic mail and document distribution are two more text management technologies that are becoming commonplace in offices. Time lines and reduction of duplicate copies are two key benefits here. Most critical business documents need to go through a review cycle. The physical process of duplicating and distributing such documents, collecting comments and redrafting and recirculating drafts for approval can add hours, even days, to the time needed to reach key business decisions. Electronic document distribution allows immediate distribution and, in some cases, the ability to track individual comments or changes to each version of the document.

On a more mundane level, many companies spend considerable amounts of money duplicating and distributing internal memoranda. Many of these documents are filed away by recipients and take up valuable office space. Electronic mail can make a single electronic copy of a document accessible to every person in an organization. Electronic filing can make that same single copy available for everyone's reference.

Many businesses already rely on text management systems to handle critical information, and many more will rely on them soon. In this environment, the WP package will affect much more than typists in a center. The key to making text management systems work is often the choice of a text editor — in particular, the choice of one text editor instead of several.

Perhaps an analogy will help explain the situation. Imagine a party with groups of people from different countries. Each person is fluent in his own language, but does not speak any other.

The first problem is finding a translator fluent in all the languages — a difficult but not impossible task. Then we must be concerned about those things that are lost in the translation — the idioms, expressions and nuances that may not have a counterpart in another language. We now need a cultural specialist. Finally, we have diplomacy problems (who speaks first and to whom) and the format of each message (what does someone choose to discuss first, and why?). To interpret the meaning of these messages, we probably need a diplomat.

You may find a team with all these talents for your international meeting, but it is unlikely. In the same way, solutions may exist to the problem of integrating various text editors. But the quality of the integration is crucial to the success of your system.

There are no standards among WP packages for coding formatting characters. Some WP editors use single characters for formatting codes such as centering, end-of-paragraph or end-of-page; others use multiple character codes. In many cases, the position of these characters within a document also determines their meaning: the presence of an end-of-page character may turn a header code into a footer code.

What this all comes down to is that a perfect translation program — one that would give 100% editable transfer in both directions between different WP editors — is extremely hard to produce. It may be technically possible, but in most cases the difficulty (and cost) of producing such a program makes total editable transfer unfeasible. Like the international business community, you must resort to a standard language. In the case of the office, this means a single WP editor.

What if you can get a translation program that can handle 90% of the document? What if it is simply a question of keeping an eye out for a few misinterpreted characters and remembering to change the format characters in your outlines, or not using some of your word processor's features that the translator cannot translate?

It is certainly possible to coexist with different WP editors. Offices are doing so now and will continue to do so. Some packages are close enough in coding to leave only a few loose ends during editable transfer. However, two major risks are associated with this "close, but no cigar" approach.

First, searching for and cleaning up translation problems takes time. This means you lose some of the benefits of quicker document production, which is a major advantage of word processing. At its worst, the cleanup may be so time-consuming or troublesome that instead of using the documents that already exist, people will recreate and reenter them.

Cleanup of translation problems is often hidden from management view. When faced with editing documents that have been transferred from different text editors, many WP centers or secretaries will retype those documents. This means higher labor costs, slow turnaround and loss of productivity.

Why don't all the people who write WP programs get together and agree on one approach for coding text editors? Major OA vendors are encouraging just that by publishing their internal formatting codes as proposed standards. For other WP program suppliers, the economic benefits of converting to these standards are unclear.

Increased use of text management systems will provide the impetus to standardize WP document storage approaches. The benefits of electronic filing and retrieval, document distribution and electronic mail are becoming readily apparent to many office managers. Most text management systems work only with a single word processor. Some, however, are designed to accommodate several word processors, each targeted to a different level of user capability. Such systems enable a secretary to use a command-driven word processor for original entry of text and a professional to use a menu-driven editor to make modifications to it. The same functions are present in both programs.

When WP offered only the ability to produce more documents more quickly, there were few rewards for an integrated approach. As OA and text management systems become more sophisticated, so will the benefits of an integrated system.

Now is an excellent time for managers to begin to make choices that bring the lone wolves back into the fold. Increasing numbers of WP packages address the integration problems of the office while providing powerful features to the individual user. More important, there are now text management systems that give new and sophisticated capabilities for networking, distribution, filing and sharing of documents.

The name of the game is still compromise. The confirmed lone wolves must be persuaded that the benefits they will receive from an integrated system are worth giving up their current favorite WP package. Armed with information and the correct systems perspective, the office manager should be able to persuade everyone to flock together. OA

Traut and Tebbe are consultants in the technical services organization of Arthur Andersen & Co. in Chicago, Ill.

INTEGRATED MULTIFUNCTION SOFTWARE

BY JONATHAN L. YARMIS

When people look back to the hottest competition of the summer of 1984, it may not be the Olympic Games they're remembering. Another battle — the battle of the heavyweights of integrated microcomputer software packages — began in July, when Lotus Development Corp. formally introduced Symphony, and Ashton-Tate brought out Framework.

There are a host of other competitors in this marketplace, but most attention has been focused on these two. With $8 million or so apiece budgeted for advertising, they are dominating buyers' attention, too. In fact, Ashton-Tate was one of the advertisers on this summer's television cov-

erage of the Olympic Games. The end user derives a tremendous benefit from the integration of application packages. Redundant data entry is costly in both time and dollars, and it limits a micro's effectiveness for a working professional. Facilitating data entry, processing and reporting or redirection greatly expands the micro's range of applications.

However, a trade-off usually is involved. To achieve integration, power is often sacrificed. Ideally, the user could use the application package of his choice and achieve the desired level of integration with no problems. Unfortunately, at least in the MS-DOS world, this is not the case. The user must decide how much power he will sacrifice in the individual application package to achieve integration.

For instance, if WP will occupy 90% of the time a user spends working on the IBM PC, a stand-alone package with cumbersome transfer routines may not be a bother. But if a user constantly enters data from a spreadsheet or data base into the letters typed, a separate file conversion routine following another program's translation to a text file may cause him to rethink that choice.

The user who elects the integrated approach has several choices — the all-in-one package like Symphony and Framework represents just one approach. The situation in the early days of the Apple Computer, Inc.'s Apple II computer was chaos. Out of the chaos, championed by Software Arts, Inc. came the Data Interchange Format (DIF), which was simply a way data could be moved easily from one application program to another. DIF, however, was not an answer to all data interchange needs and so arose the DBF, DEX and others.

Stepping into this void were the integrated software packages (like Lotus 1-2-3), the integrated series (like Software Publishing Corp.'s PFS series) and the integrated environment (like Apple's Lisa or Macintosh, Digital Research, Inc.'s Concurrent DOS, Microsoft, Inc.'s MS-Windows, Quarterdeck Office Systems, Inc.'s Desq or Visicorp's Visi On).

The integrated environment offers the greatest promise. In the relatively closed system of the Apple 32-bit machines, software authors who adhere to the Apple guidelines will find that almost any application program can share any data with any other program. However, because of the current paucity of software for these machines, this is a distinctly limited advantage.

The MS-DOS world developed with no such strict standards relating to data interchange; users have been left to the mercy of the authors of applications software. This has resulted in a situation where data exchange is no easier than in the days of DIF. The operating environments facilitate transferring data, but provide little help when software authors offer only limited capabilities for such transfers.

However, this integration of stand-alone application packages still represents a desirable goal. For all the outstanding features on any particular product or series, the individual components often suffer in comparison to the best of the stand-alone packages.

To achieve integration, power is often sacrificed. Ideally, the user could use the application package of his choice and achieve the desired level of integration with no problems. Unfortunately, at least in the MS-DOS world, this is not the case. The user must decide how much power he will sacrifice in the individual application package to achieve integration.

You might prefer the 1-Spreadsheet of 1-2-3, but the 2-Graphics suffer in comparison with Graphwriter Communications, Inc.'s Graphwriter and the 3-Database is not in the same league with an Ashton Tate Dbase III or even Nestar Systems, Inc.'s DB Master. This is made all too clear when, as in the case of Symphony, a program tries to be almost all things to almost all people.

The integrated series attempts to minimize these shortcomings. The integrated series like the PFS: series, Micropro International Corp.'s Star series or the offerings from Perfect Software, Inc. offer the user a consistent user interface from package to package and an easy path for data transfer. The integrated package offers the same features under a common umbrella. There are advantages and disadvantages to each. Compared with the all-in-one package, the integrated series usually offers a lower degree of integration with correspondingly greater difficulty in effecting data transfers. However, these packages usually allow for an easier interchange with a nonmember of the family.

The all-in-one packages have a high degree of data interchangeability among applications, but the interface with the outside world is limited. For instance, Lotus 1-2-3 can read a Visicalc worksheet, but does not support the ability to write such a worksheet.

The moral of the story is if you are going to use 1-2-3, you are going to use only 1-2-3. 1-2-3 does support DIF and the DBF format of Ashton-Tate's Dbase II, but these least common denominator forms of data transfer were incorporated to move data to programs offering complementary, not competitive, features.

Windows offer a different set of features. Again, it is beneficial to be able to view several different areas of a document or spreadsheet, or to be able to look up something from a data base while working in a word processor.

However, this is a case where the capabilities of the system exceed the needs of the user. The desktop metaphor promoted by the Palo Alto Research Center (Parc) and implemented by Apple's Lisa and Macintosh is in fact only a partially correct representation. There are fundamental differences between the computer screen and the desk; besides, most users don't want their screen to look anything like their desk. Anything beyond three or four windows begins to look like clutter and becomes counterproductive.

Environments like Microsoft's MS-Windows aspire to be the operating environment in the MS-DOS world, but they are threatened by the all-in-one application programs like Framework and Symphony, each of which have their own windowing schema (or framing, as Ashton-Tate refers to it). If these packages achieve a significant market penetration, the demand for the separate window environment would be considerably lessened. In fact, Framework has a "DOS Access" capability, which allows the user to run other MS-DOS software from within the Framework environment.

Although there is no shortage of competition in the marketplace, most attention has been focused on the offerings from Lotus (current king of the spreadsheet) and Ashton-Tate (king of the data base). This attention results not only from their new and powerful software offerings, but from the marketing clout and distribution power that lets them get their products to the consumer. And, as the microcomputer industry matures, it is increasingly marketing and distribution that determine the success of a product — superiority of the product is not always necessary nor evident.

Although Ashton-Tate and Lotus maintain they are going after different markets (Framework for the word pusher, Symphony for the number pusher), they are perceived as competing products and most users will choose one or the other.

First, the similarities: Both programs are memory hogs. IBM not only announced a price cut in June — they also announced an increase in the minimum random-access memory (RAM) configuration of the PC. Remember when you could buy a 16K-byte IBM PC and the mother board held only 64K? Those days are long gone. Symphony, for example, requires a minimum of 320K bytes, and that memory configuration leaves a work space of less than 64K bytes.

Some Apple users may be accustomed to this situation, but business users of the IBM PC generally have work spaces and worksheets numbering hundreds of kilobytes. Framework is a little easier on memory, running in 256K bytes.

Both programs consist of word processing, spreadsheet, graphics and data base functions. Framework adds an outline processor (a la Think Tank) and Symphony includes a communications package.

Both have made extravagant advertising claims. Ashton-Tate's brochure for Framework claims "With Framework you can . . . creatively accomplish virtually any other managerial, professional or entrepreneurial task." Symphony merely "offers unlimited potential for extending the power and reach of your computer."

A closer look at Symphony may demonstrate what it is, exactly, that these packages are offering.

Lotus rode its first-generation integrated package 1-2-3 to the second spot among independent microcomputer software suppliers (behind distributor Softsel Computer Products, Inc.) and the fastest growing software company in the entire industry, according to *ICP Business Software Review*'s Special Edition, 1984. 1-2-3 is really a sophisticated spreadsheet with some graphics capabilities and limited data-handling features. It became the clear winner in the first major software battle on the IBM PC against Context Management Systems, Inc.'s MBA.

This powerful spreadsheet is just the start of Symphony. Lotus has added a number of new commands and text-handling capabilities, has rearranged the placement of some old ones (experienced 1-2-3 users will face some initial confusion) and has added some user convenience features like passwords and hidden cells.

The spreadsheet has a theoretical maximum of 8,192 rows and 256 columns; however, even a PC packed up to 640K bytes won't be able to reach the lower right corner. But maybe the next generation of personal computers . . .

The data base function can support "over 8,000 records, over 250 fields." If those numbers look familiar, that's because the data base input screen just dumps the data items into the spreadsheet. This has several implications. First, the data base is entirely RAM-resident. Sorting is very fast, but the size of the data base is limited by the amount of RAM. Also, all of the powerful functions of the spreadsheet can easily be entered into the data base. Finally, you can have multiple data bases per spreadsheet.

The word processing package contains most of the features expected on a full-featured word processor, including word wrap, text move, search and replace and mail merge (with the data base). The integration of spreadsheet and word processor also allows

the creation of "dynamic" documents, which are updated as the spreadsheet is updated. The fact that the word processing document is also part of the spreadsheet may cause some confusion for operators. Although the document appears as part of a spreadsheet, it is not editable from within the spreadsheet environment, only from within the word processor.

The graphics package is an enhanced version of the graphics found in 1-2-3, adding high-low/open-close graphs and exploded pie charts, multiple graphs on screen and log and exponential scaling.

The communications package is a full-featured asynchronous communications package with autodial and auto-log-on features. Data may be captured directly to a spreadsheet or document and the communications session suspended for further analysis and processing. It also integrates with the word processor for electronic mail environments. The public domain X-modem Christiansen error-checking protocol is supported.

Features shared by all the components are a command language (the bigger brother to 1-2-3's macro capability), which will allow performance of all Symphony features, as well as a "learn" capability, which allows real-time construction of these commands. Symphony also has the ability to support "add-ins," future program offerings that will run in the Symphony environment.

Already anticipated add-ins include a spelling checker for the word processor and one that will provide the ability to suspend Symphony, return to DOS and subsequently reenter Symphony.

Perhaps most important, Symphony files are 1-2-3 data-compatible, providing an easy upgrade path for existing 1-2-3 owners. Lotus is further facilitating this upgrade by offering Symphony to registered Lotus owners for the $200 difference in price between the two programs ($695 vs. $495).

Framework also has powerful spreadsheet, word processing and graphics features. As Lotus has done with 1-2-3 owners, so has Ashton-Tate done with Dbase II owners. As an inducement to stick with Ashton-Tate products, the data base feature of Framework is fully compatible with Dbase II and Dbase III, providing a natural path for more than 240,000 registered Dbase II owners.

Another feature unique to Framework is Fred, its 140-verb, full-featured programming language that can be used across all framework elements to build automatic or custom applications.

Framework's DOS Access capability is most notably positioned to overcome the lack of a communications capability, although it will also support interface to any DOS application. Ashton-Tate calls its window scheme "framing." Frames are "self-contained, interrelated displays that can be nested, resized and relocated anywhere on the screen."

As with Symphony, Framework requires PC-DOS 2.0 or 2.1 and does not require a hard disk. Both programs will function with either a color graphics adapter or monochrome adapter.

Symphony and Framework are far from the only integrated applications for the MS-DOS world, but they are expected to garner the lion's share of the marketplace. However, there are a number of worthy competitors (and a number of manufacturers producing vaporware, products that are announced, but far from being delivered). Among these products are Software Products International's Open Access, Softrend Inc.'s Aura and the long- and still-awaited Ovation (a word processor-driven integrated package) from Ovation Technologies Co.. And still alive and growing is Micropro's integrated series, Wordstar, Infostar and Calcstar; Martin Marietta Data Systems, Inc.'s Keep It, Calc It and Show It; Innovative Systems' Smart Word Processor, Spreadsheet with Graphics, and Data Manager; and Perfect Software, Inc.'s Perfect Writer, Perfect Filer and Perfect Calc.

The user is left with a dazzling array of options and choices. In the end, it is still a choice of convenience vs. power. The integrated applications offer the tremendous convenience of similar command structures, data formats and, perhaps, no disk swapping; the stand-alone packages offer the ultimate in power with the most inconvenient data transfer facilities.

Although Framework and Symphony will garner much attention, the market for these packages is much more limited than for a 1-2-3. The promise for these types of packages is still for future machines with greater processor capability and greater storage capacity. OA

Yarmis is a personal computer analyst at General Instrument Corp., Clifton, N.J.

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OA GETS ELECTED TO THE U.S. SENATE

BY GLENN RIFKIN

RICH TENNANT

Change comes slowly to the U.S. Senate. The august body, with 200 years of rules and protocols dictating every move, will never break any speed records for progress. Thus, the influx of office automation systems into the Senate represents nothing less than a major upheaval.

Nonetheless, the offices of a majority of the 100 senators are already being equipped with OA systems from one of three vendors — Prime Computer, Inc., Honeywell, Inc. and Data General Corp. — in what is projected to be a $20 million investment. After a year-long pilot in 12 Senate offices and a tedious procurement process to select vendors, the influx is under way. In an institution that receives more than a million pieces of mail per month, the arrival of automation has caused quite a stir.

"This is the big step that takes us out of the 19th century and puts us into the 21st century," stated Richard Yurko, executive aide to Sen. Bill Bradley (D-N.J.), about the OA plan. "It's the best thing to hit the Senate since electricity."

Though the office systems will undoubtedly have a major impact on day-to-day operations in individual Senate offices, it is unlikely that even the most well-thought-out OA plan will entice many senators to hunker down at the terminal for a bit of spreadsheet or word processing.

Instead, the beneficiaries of automation will be the adminstrative and support staffs which have traditionally been buried under bales of legislative paperwork.

"What we hope to get is improved productivity out of Senate staffs," said John Swearingen, director of technical services for the Senate Committee on Rules and Administration. "We know that senate staff on average works more than an eight-hour day, and many work more than a five-day week. Much of their time is spent dealing with constituent mail, which literally swamps an office. We just want to give them some better tools.

"I think OA is part of the working conditions of the 1980s," he continued. "When you're hired to work for a company, you don't ask whether there will be a telephone, a desk, lights and air conditioning. That is what people expect. I think this equipment is about to become an accepted, required part of an office environment. It's on the way."

Automating the Senate, however, has not been a simple task. Though it is a single, legislative body, the Senate is actually "like one hundred little fiefdoms," according to Gary Auxier, press secretary to Sen. Walter Huddleston (D-Ky.). Senate offices are organized and operated completely at the discretion of the individual senators, and there is little or no cohesion among different offices.

Another obstacle facing the automators is the facility itself. Though half the offices are located in the spacious new Hart Building, the other half are entrenched in the aging Dirksen and Russell Buildings (the latter was completed in 1909). With no auxiliary space available for computers, CPUs are likely to be found whirring away directly next to someone's desk.

Unlike a system installed throughout a corporation, OA's entrance to the Senate will have 100 variations. Which vendor, which system (to some degree), who will get the terminals and how the configuration will be set up will be subject to the whims of each senator and office manager.

The allocation of equipment to each office will vary depending on the size of the senator's constituency. Larger offices will receive up to 45 terminals; smaller ones will get 25. A senator may request more or less equipment depending on need.

Providing the equipment will be Prime, DG and Honeywell. The three were chosen from among 32 vendors that replied to an open request for proposal (RFP) from the Rules Committee. According to Patrick Sarman, senior systems analyst for the committee, the three were selected because of a combination of technical and cost ratings that fit the Senate's requirements. Being selected merely gives those three vendors the license to do business with the senators' offices. Prime, Honeywell and DG are now going into each office and demonstrating their product lines in hopes of garnering as much business as possible. The Rules Committee has no preferred vendor, Swearingen said.

Though the installation of systems is just starting, OA is no stranger in the Senate office buildings. A year-long pilot project encompassing 13 offices was begun in December 1982. The pilot followed extensive hearings by the Rules Committee, chaired by Sen. Charles Mathias (R-Md.), on the benefits of OA. During those hearings, in which testimony was heard from leaders in the computer industry, it became clear that the technological clock had been ticking while the Senate slept. "I am afraid," said Sen. Mark O. Hatfield (D-Ore.), "that the times caught up with us on this committee and we were caught with our pants down. We have not kept pace with technology."

Blame for this faux pas could not be focused on any single individual. Many long-time senators, satisfied with the status quo, have resisted change, and the Senate, with its countless rules and procedures, makes no quick alterations. It is a feat of some note, in fact, simply to get enough senators together to vote on an issue. Several senators — Hatfield, Gordon Humphrey (R-N.H.), Bradley and Edward Kennedy (D.-Mass.) — recognized the overwhelming need for improved technology and pushed the Rules Committee to finally address the problems.

The Rules Committee entrusted its pilot to Swearingen and Sarman. Six vendors were contacted — Sperry Corp., Digital Equipment Corp., IBM, Xerox Corp., Wang Laboratories, Inc. and Honeywell. They were invited to install OA equipment in the offices of 12 senators, including Kennedy, Bradley, and Robert Dole (R-Kan.). In addition, Humphrey worked out a similar agreement with DEC outside of the pilot so that his office could get an early start in OA. Though Humphrey's office received more than twice the amount of equipment of those in

the pilot, the response in his office to the system was included in the pilot report.

Those in the pilot received equipment with a leased value of no more than $2,000 per month per office. Although this just nominally addressed the needs, the pilot was designed not as a vendor sales opportunity, but as a chance to see how people would respond to the systems. The issue of cost-justification was addressed to some degree, and resulting productivity increases of between 5% and 20% were generally agreed upon by the Rules Committee. Though some offices in the pilot had greater success than others, according to Swearingen, one thing became clear. The need for OA in the Senate was long overdue.

"My office had the opportunity to be part of the pilot," Kennedy said. "We've experienced firsthand how an office automation system can dramatically increase the efficiency of a Senate office."

"Since we've broken new ground here and demonstrated that it can work, 75 senators and staff people have come to look at our system," Humphrey added. "Now there's an eagerness to computerize the offices."

One of the major tasks facing the new OA systems is constituent mail. Up to now, the Senate has relied on an outdated bulk mailing system called the Correspondence Management System (CMS) to address its constituent mail needs. One item the pilot program underscored was the need to phase out CMS.

CMS, provided on a time-sharing contract by United Information Systems, Inc. in Pittsburgh, Pa., allows the senators to answer every letter that comes in (some offices get up to 15,000 letters per week) in a reasonable turnaround time. The senator's staff can input a particular letter or paragraph on major issues of constituent interest via terminals in each Senate office.

Though it is a mass production system, Swearingen likes to point out that CMS is automated, but not totally disengaged from the individual senator. CMS, unfortunately, has a word processing program that is 20-years old, he said, and doesn't have a full-screen editor. It is simply not suitable for ad hoc mail and other correspondence that senators must handle. Swearingen insisted that the OA implementation is not designed to completely replace CMS in the near future. "The new systems may supplant CMS in every office, but at the moment, it's not our goal to replace CMS."

Instead, the new systems are targeted to handle not only personalized letters, but the mass of other WP functions such as speeches, press releases, floor statements and the endless other documents that have heretofore been relegated to typewriters. In addition, calendaring, scheduling, communications and even certain spreadsheet and accounting applications are important features supplied by the OA systems.

PHOTO BY G. RIFKIN

Sen. Gordon Humphrey (R-N.H.) at his terminal.

The systems will also interface with key data bases from the Senate Computer Center and the Library of Congress, Swearingen said. The pilot program demonstrated how overwhelmingly effective the applications could be.

"It has dramatically changed the way we work," explained Yurko, whose office was equipped with a DEC PDP-11/40 minicomputer, nine DEC VT100 terminals and two printers. "The system has enabled the staff to spend less time on clerical functions and more on creative ways to deal with our constituents. The information boom has increased the work load in here severely over the past few years. We're now saving about 15 hours per week in clerical time. Files that never got attention are being organized, and the professional staff is being supported as never before. I wonder how we ever lived without it."

Kennedy's office has also witnessed massive changes. Though WP is the most widely used function on the Honeywell DPS 6/34 system, scheduling is the most talked about application, pointed out office manager Chris Doherty. Because he is in constant demand, both within the Senate and on a local and national basis, Kennedy's schedule may change up to 12 times per day. Honeywell provided modified software to handle the senator's schedule, which used to be kept by hand on three-by-five file cards.

Humphrey's office has, perhaps, benefited more than any other thus far because the senator himself is more than just an advocate. A computer hobbyist with an Apple Computer, Inc. Apple II at home, Humphrey also keeps on his desk a terminal that he uses regularly for letters, speeches and electronic mail.

According to Paul Young, special assistant in charge of the OA system, the office staff adjusted to the new system immediately. He attributed it to a top-down approach — the senator insisted on getting all his messages electronically, and it left staffers little choice but to learn the system.

"The Senator felt that as one of the world's most prestigious bodies, we should lead the way instead of being behind," Young said. "The system has turned out to be a great time-saver and has created a much more pleasant office environment. We never lose documents anymore and material is easily retrieved. For administrative assistants, it has saved almost three hours per day. We're still finding new ways to use it. What you can do is limitless."

Humphrey's office, equipped with a VAX-11/730, 14 terminals and two letter-quality printers (as well as two terminals in his office in Concord, N.H.), faces the prospect of having to remove the entire system. All the Senate offices will eventually have to have a system from one of the three chosen vendors.

Swearingen pointed out that every effort would be made to accommodate offices with equipment from other vendors. Humphrey, for example, is up for reelection in November and will be able to maintain the DEC equipment at least until then. "We're not going to put somebody in a jam," he stated. "They've helped the Senate by taking the risk of being in the pilot. It would be pointless to demand they turn in something that's working."

In the long run, however, each of the 100 offices will have a choice of: Honeywell's DPS/6 (models 45, 75 or 95); DG's MV 4000 or MV8000 running the CEO package; or Prime's 2250 or 2550. The configurations will depend completely on the size of the senator's constituency; large states will get more than smaller ones. According to Sarman, all equipment, hardware, software and service, is being leased directly from the vendors and, though it varies, the cost falls in the $4,000 per month range.

The Rules Committee is currently installing two systems per week and hopes to have full implementation within 12 months. Swearingen pointed out that senators facing reelection or retirement are unlikely to ask for systems.

The decision to use three vendors was a unanimous one by the Rules Committee, prodded by virtually all the member offices in the pilot program. According to Sarman, the senators wanted a choice in order to promote competition and guarantee better service from each vendor.

"When the full Senate gets automated, it will need support and a full commitment from the vendor," Auxier said. "We wanted to maintain a selection so the vendor doesn't get complacent. With multiple vendors, you can always switch if you don't get what you want."

Despite the decision to go with three vendors, Swearingen is wary of the move. The Senate Computer Center, he pointed out, is responsible for support of the Senate's systems and "life is a lot simpler if you only have one system to support. The center has 200 people, and 40 of those are trainers and consultants. They can become a lot more knowledgeable if they can concentrate on one system."

Swearingen also disagreed with the notion that multiple vendors would foster competition and promote better service. "I just don't think the couple of hundred units coming into the Senate will be driving that market at all. I think we're deluding ourselves to think that any vendor is going to change its product because of something the Senate wants."

Bob Mague, federal sales manager for DG, agreed: "We've got to be responsive, whether there's one vendor or three."

Ironically, one of the best arguments against multiple vendors — compatibility — does not appear to be an issue in the Senate. As long as the systems can hook into the necessary data bases and provide intraoffice communications (as well as access to terminals in the home office), little need is projected for interoffice communications. Because of party politics and the dedication of a senator to a particular constituency, the need for formalized exchange of personal documents among senators is virtually nil.

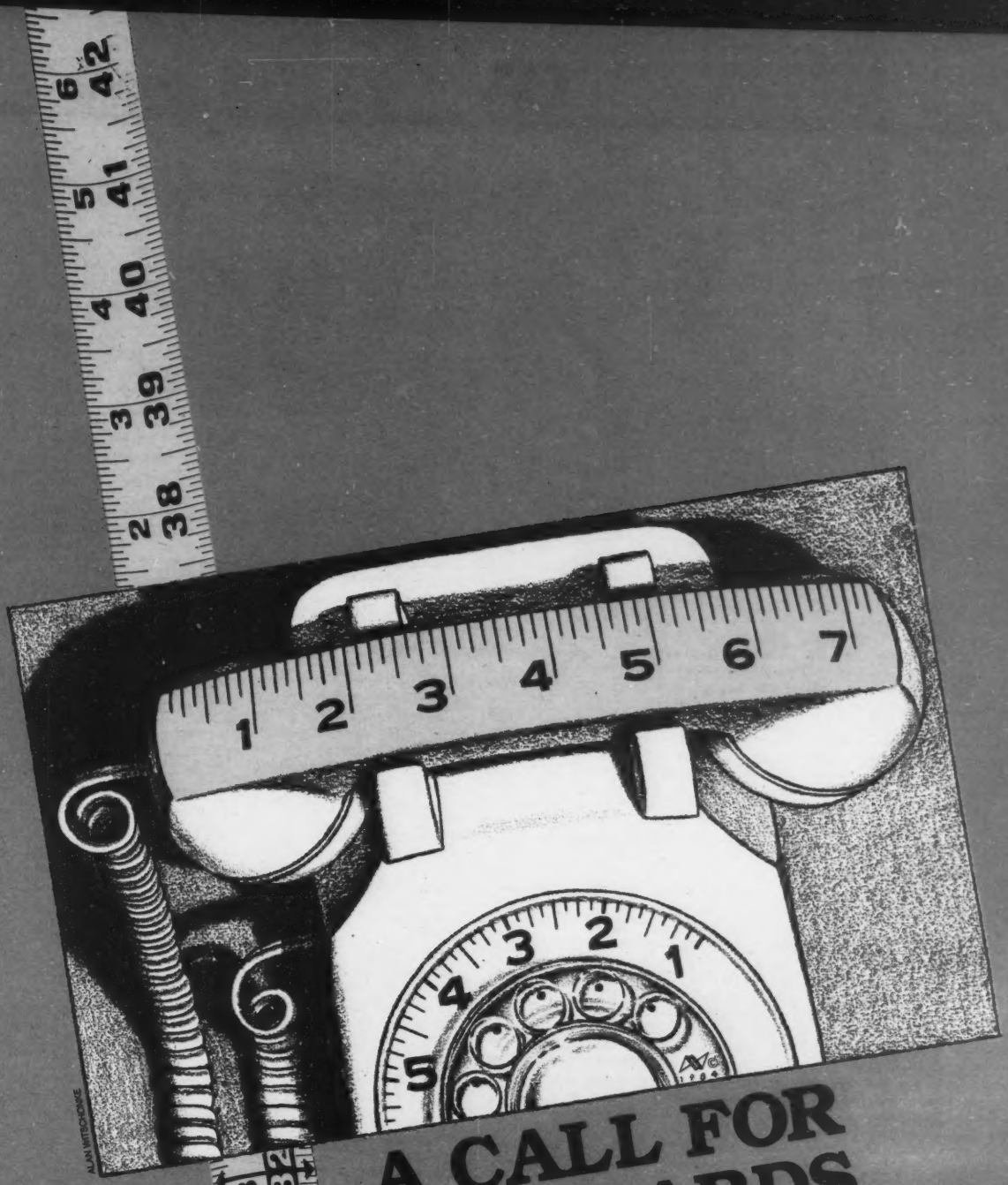
"Sen. Huddleston is the ranking Democrat on the Agriculture Committee, and I can't think of a single instance of his having conferred with the ranking Republican," Auxier said.

"I don't think you'll see a great cooperative effort," added Yurko. "The end goal for Sen. Bradley is how he can best serve the people who elected him. If we can find something to help him do that, that is vital."

As the OA installation proceeds, it will undoubtedly make believers of the skeptics who view the Senate as a slow-moving mass averse to change. Swearingen foresees potential for the influx of local-area networks — there is already coax cabling throughout the the three buildings — and electronic mail among Senate offices.

Swearingen predicted that the systems currently being installed will still be in place in five years. "Making this kind of change is a big thing," he stated. "It takes a lot of staff time, a lot of training and a lot of rethinking of how offices are going to operate. Anyone who goes through that would depart from it only for very extreme reasons." **OA**

Rifkin is senior writer at Computerworld OA.



A CALL FOR STANDARDS

BY GEORGE M. PFISTER

Why is it that the cry for standards goes out long after most users have made commitments to proprietary protocols? By the time standards are contemplated, hooks have been constructed to connect applications, media and devices, further complicating or absolutely enforcing the interfacing problem.

Many users remain unaware that the digital telephones and workstations they are installing along with their private branch exchange (PBX) systems operate with proprietary protocols and that a strong parallel to the history of mainframe-based DP exists. The mainframe processor was once the bulk of a customer's investment, but now it is surpassed by system peripherals and closely coupled networked devices.

As $200 to $500 electronic telephones or $1,000 to $2,000 integrated workstations replace the $35 telephone, similarities between the DP and PBX environments may become more obvious. In short, electronic telephones, workstations and associated applications processors may at some point reflect a greater customer investment than the PBX itself.

It has been somewhat humorously noted that "all PBX systems have the same 147 station features. Of these, the most sophisticated users use six." Most users are intimidated or confused by system interfaces that employ switchhook flashing and bizarre dialogue with "pound sign" and "asterisk" sequences.

This problem can be solved by implementing some features for users on what have come to be called "feature phones":

• Key System Simulation: Calls can be screened or picked up by multiple parties. Key systems are installed at rates as high as 50% of all stations in some environments. These systems require 25-pair cabling — which is expensive in itself — and further where fire codes require teflon cable. Because they are electromechanical in nature, they are expensive and bulky to install and maintain. As we will see, electronic and digital telephones require one-, two- or three-pair ("skinny wire") and, because they are electronic, are superior in the installation and maintenance departments.

• Function Buttons: These provide single-button activation of Hold, Call-Transfer, Do Not Disturb and other standard features, eliminating switchhook flipping.

• Speed Dial: A number of buttons can be programmed to store frequently dialed numbers with positive alphabetical reference. This is in contrast to PBX-stored lists, which require the user to memorize or reference the speed dial codes.

• Status Indicators: Beyond line condition and busy lamp fields, displays of calling/called number (or party), elapsed time and message waiting where message desk or voice store-and-forward systems are installed.

Older devices — for example, AT&T Information Service's (Attis) Ects and MET sets and Northern Telecom, Inc.'s SL-1 telephone — were able to provide most of these capabilities. These systems utilized analog signaling techniques to activate station features.

The newer products listed in Figure 1 are all digital; the codec (a word derived from coder/decoder) that performs analog to digital conversion is located in the telephone instrument.

Digital telephones are a response to present performance and future economic considerations. The digital phones described in the Figure 1 can handle simultaneous and relatively high-speed (56K to 64K bit/sec) data over as little as one twisted-wire pair. In future, it is also obvious that very large-scale integration-based digital devices will cost less to manufacture than will analog devices.

	Attis System 85	Rolm CBX II	NEC Neax	Intecom IBX	Utech UTX1001	Ericsson MD110
Half Duplex (HD) Full Duplex (FD)	FD	FD	FD	FD	HD	HD
Wiring						
Pairs	2	1	2	2	2	1
Power	1	0	0	0	0	0
Total	3	1	2	2	2	1
Bit rate (K-bit/sec)						
Voice	64	64	64	64	56	64
Data	64	64	64	56	8	16
Control	32	8	8	8	8	16
Total	160	256[1]	256[1]	128[2]	72	96
Distance	5,000	3,000	4,000	2,000	2,500	3,000
Modulation	PCM	PCM	PCM	PCM	Delta	PCM

[1]Control estimated at 8K bit/sec. Other bandwidth reserved for future use.
[2]Does not include synchronization.

Figure 1. Some Examples of Digital Phones

The digital phones discussed here operate with protocol structures that can be classified according to half or full duplex; twisted pairs required (one, two or three); bit rate; frame structure (voice, data, control); distance; and modulation type.

Half or Full Duplex: Traditional analog transmission of voice is full duplex on two wires. Rolm Corp.'s Rolmphones utilize one pair to transmit 256K bit/sec in either direction. Intecom, Inc. and NEC Information Systems, Inc. utilize two twisted pair to achieve 128K and 256K bit/sec, respectively.

The United Technologies Communication Co. UTC 1001 and Ericsson, Inc. MD 110 transmit voice and data frames in what is generally termed "ping pong," where the UTC frame of 72K bits or the Ericsson frame of 96K bits is transmitted in burst mode at 256K bit/sec and the path is turned around with propagation delays transparent to voice or data.

Twisted Pairs: The UTC, Intecom and NEC devices operate over two-pair wiring. Attis products operate over two pair, with a third required for power.

Rolm drives its Rolmphone series over one twisted pair through the use of innovative and proprietary circuitry. It is interesting that Rolm has installed its 13,000 systems with three-pair wiring; as a result, two pair are available for other uses like local-area network access.

Bit Rate: All these digital phones support relatively high bit rates; however, you should be aware that none of these rates approach the practical capacity of twisted-wire pairs. For PBX distribution distances, this rate is in the megabit range.

Frame Structure: With the exception of the UTC 1001 — which uses Delta modulation at 56K bit/sec — all the other products transmit digital voice at the standard pulse code modulation rate of 64K bit/sec.

As can be seen in Figure 1, the UTC and Ericsson products allow for simultaneous data transmission at 8K- and 16K bit/sec respectively, which would be seen to be targeted for the casual or medium-speed user. Both products will also support higher rates (for example, 56K bit/sec) over separate pairs and PBX ports.

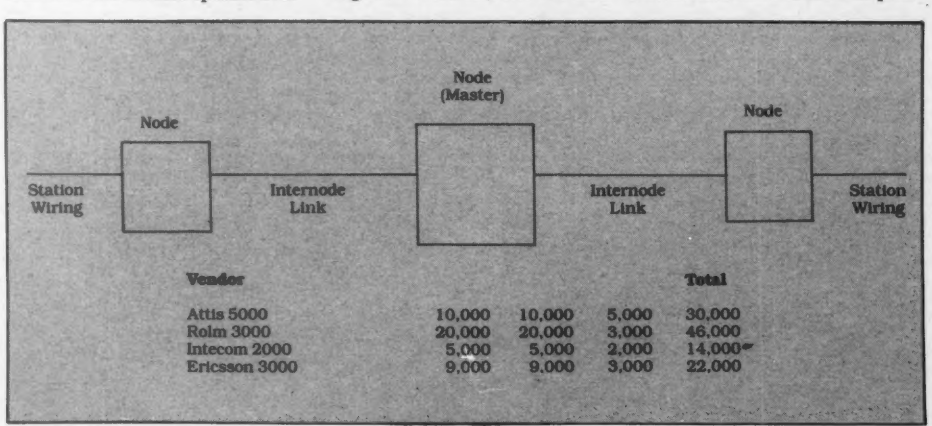
The other vendors support speeds in the 56K- to 64K bit/sec range and could therefore be seen to offer comfortable support for future office automation applications even as far as highly compressed video.

Distance: The distances specified for these digital transmission schemes of 2,000 to 5,000 feet are all feasible and cover the vast majority of installation situations. When the trend toward distributed PBX topologies is considered with essentially distributed modules or concentrators, the practical distances become miles instead of feet (see Figure 2).

Figure 3 on Page 49 reflects the current position of PBX installations for most users, with the relatively small penetration of digital phones for most situations. Where feature phones are used, the implementation of the control protocol is relatively simple.

As we begin to add applications in Figure 4 (see Page 49), a natural growth in complexity of control fields appears. When we add voice store and forward, more feature keys will be activated and habitually used to enhance message pickup, forwarding, scanning and disposal.

With the addition of electronic mail to our smart phone, we increase protocol complexity by assigning control codes for soft keys, session establishment, prestored lists and editing (as well as electronic mail's voice store and forward corollaries, such as pick-



Vendor				Total
Attis 5000	10,000	10,000	5,000	30,000
Rolm 3000	20,000	20,000	3,000	46,000
Intecom 2000	5,000	5,000	2,000	14,000
Ericsson 3000	9,000	9,000	3,000	22,000

Figure 2. Distances

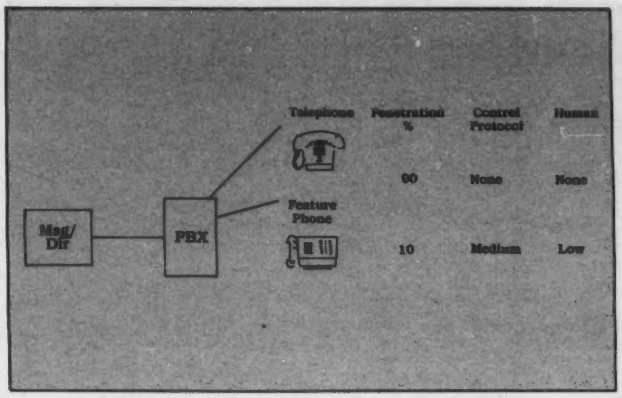


Figure 3. PBX Migration Path — Present View

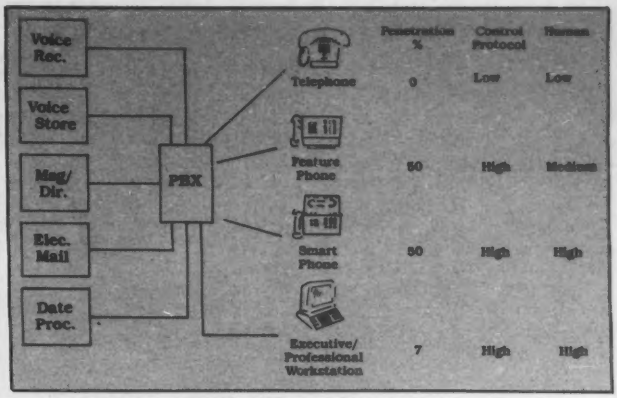


Figure 4. PBX Migration Path — Long-Term View

up and forward).

The smart phone truly opens Pandora's box. Research indicates that when users are given a keyboard/display, they will wander far afield into analytical processes and data base systems. We now add log-on routines and, perhaps, specialized formatting to optimize call routing between terminal, PBX and processor.

The term "smart phone" should be further qualified in two ways: it is itself programmable and, ultimately, no two units will be programmed the same.

The user thinking about replacing his PBX will face not only the economic problems of replacing the switch, applications processors and terminals, but also the problems of an angry user community called upon to reprogram its terminals, either feature phones or smart phones.

To return to our comparisons of the mainframe DP and PBX environments, we can now see some real similarities.

Our future view of the PBX reflects complex communications, including session establishment, monitoring, accounting between devices that operate under an esoteric, often user esoteric, proprietary protocol with intense device, applications and communications dependencies.

DP vendors can exert control over their customers by relying on the house-of-cards applications code, some of which has been patched and kluged over periods as long as 10 to 20 years. Many users are afraid to tamper with their systems because they anticipate catastrophic system failures or expensive processing errors.

The corollary control technique that can be applied by PBX suppliers — in addition to the obvious economic issues discussed above — will be the control of user behavior. As OA systems become more deployed, control over just what the user does or implements is impossible. If that is true, the bulwark of the PBX vendor will be the disruption and lost productivity inherent in changing PBX vendors once our future view, or subsets of it, are installed. Need we say more!

Relative to transmission of integrated voice and data over twisted pairs, an attractive standard might well be the current CCITT-recommended Integrated Services Digital Network (ISDN) rate of 144K bit/sec. This standard, usually referred to as CCIS Standard 7-Basic, allocates two frames of 64K bit/sec for voice or data with 16K bit/sec reserved for control. This interface was designed to operate on two-pair (four-wire) wiring at distances exceeding those stated for other protocols in this article.

Although the standards process does not imply compatibility at higher levels, it might restrict or limit vendors from extremely esoteric placement of control fields or utilization of nondigital word increments.

It is reasonable to assume that most users of large PBX would support ISDN with a primary or T1-based interface, or that Basic interfaces could be shared. As such, the PBX would provide the necessary conversions to ISDN format, making direct phone compatibility with ISDN a moot point. However, as discussed above, adherence to standards in general always provides the user with a certain degree of protection and could also enhance interface procedures for small remote locations or off-premise extensions.

Recommendations: The purpose of this discussion was not to frighten the reader, but to discuss a poorly understood or ignored subject in hopes that this complex situation can at least be approached with open eyes.

We have a number of recommendations:

- Realize that this commitment is a major one; in many cases, you are not buying a simple telephone system.
- Realize further that many of these systems will simply not work correctly unless highly integrated at all levels. Stand-alone voice store-and-forward systems without message indication as at least the first level of integration are usually unsuccessful for office communications.
- Vendors that establish a large installed base of these systems will get a premium price for their terminals and processors.
- Vendor protocols will be intentionally or naturally proprietary, to the point that interface with third parties will be very difficult, if not practically impossible.
- Because of today's product glut and the future learning curve, the PBX business is an untenable one. Vendors that do not reflect some of the applications processor, terminal and terminal products described above may not be around very long.

The reader can undoubtedly think of any number of further scenarios and impacts.

If there is a major point here, it is that these systems will work best only if highly integrated; despite a conceptual or intuitive negative reaction, reliance on a single vendor is probably the most practical approach. All of which points to one good bit of advice: Pick your vendors very carefully.

OA

Pfister is president of Perspective Telecommunications Group, a consulting firm headquartered in Paramus, N.J.

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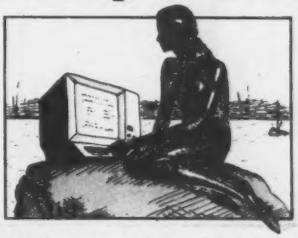

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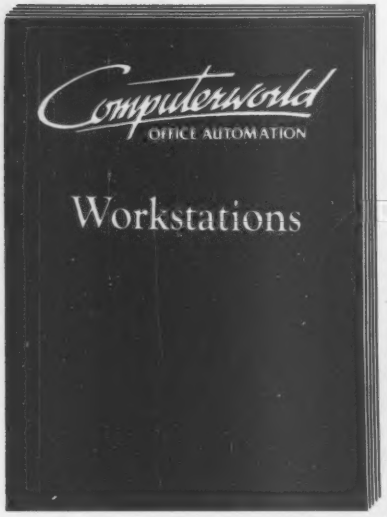

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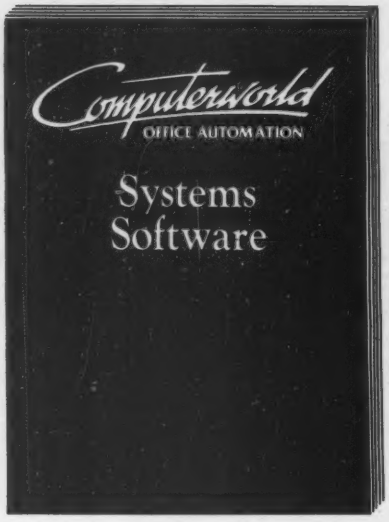

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The user interface of voice technology has not matured yet. What will voice synthesis hold for users?

By Jeffrey Cogen

Fantasy lovers have traditionally been intrigued with the idea of inanimate objects taking on human characteristics. From Dr. Frankenstein's bizarre creation of life to the talking computers in the film Star Trek, the fascination with the creation of a human voice has gone unabated. In fact, for those with a yen for science fiction, the talking computer may seem like the ultimate user interface.

Though fact is catching up quickly with fiction, fluent and conversant computers are not yet ready to enter our lives. Voice technology, however, has already made great strides and is moving from the laboratory to the marketplace. The potential market for voice recognition is expected to be enormous; its lesser known companion, voice synthesis, is also making significant advances, although not yet grabbing much of a market.

Voice technology is divided into three distinct areas: recognition, response and synthesis. Voice recognition, the recognition of spoken language by the computer, will almost certainly produce the ultimate in office automation — the computer you can speak to.

Voice response, commonly referred to as "canned speech," is the process of taping human speech, digitizing it and piecing it back together in the appropriate response.

Voice synthesis — or text to speech — products synthesize speech from computerized text in real time, translating into speech anything that has been keyboarded.

Although almost everyone agrees that voice is the most natural mode of communication, no such consensus exists on other voice questions, such as the arrival date for voice interface

products with unlimited capabilities, or the need for the technology in its present incomplete stage. Few can predict when such giants as IBM, Wang Laboratories, Inc. or AT&T will join the game. Although all three have major voice research and development projects under way, the products have yet to appear in the market.

The pressing question, then, is whether users in the office can be convinced that they need voice synthesis products; the question for the future is how soon the technological problems facing voice recognition will be solved.

If voice technology is to produce a computer that can converse freely with its users, the machine must understand human speech and be able to produce speech that is understandable. Although voice recognition may be a major factor in the office of the future, products that speak are currently the most technically advanced.

Voice response is perhaps the most familiar of all voice technologies; it is responsible, for example, for the messages from the telephone company when a number we call has been disconnected. These messages, composed of pre-recorded phrases and digits, are pieced together in the called-for response.

For companies that require only a limited number of fixed messages to be spoken, voice response is a cost-efficient option. Periphonics Corp., a 15-year-old Bohemia, N.Y., voice response systems house, has sold systems to over 250 banks. These systems, which are priced from $30,000 to $500,000, perform a variety of services — informing account holders about their balances and the current interest rates and allowing them to transfer funds — thereby freeing customer personnel for other tasks.

Charmer Industries, Inc., a metropolitan New York liquor distributor, is one Periphonics installation that uses voice response to enable salesmen to place orders straight to the computer over any pushbutton phone. "Most salesmen use the voice system and don't use the Order Department now," Marco Fernandez, DP manager for Charmer, said. "This allows the Order Department to handle more customer calls. Another advantage is that a salesman doesn't have to wait two hours to get the price on a COD order. When the computer gives him the price, he can tell the customer right there. Then, when the customer approves it, he can tell the computer to put through the order."

Charmer had formerly used an IBM system with tonal prompts to let its salesmen place their orders. Fernandez said some salesmen had refused to use this system, and many more are using the voice prompt system. In specialized cases such as this, the quality of the audio response is less important than the replacement of tones with words.

Many experts agree voice response produces more natural sounding speech than voice synthesis. "Because you start with a real voice," said Dave Gilblom, sales manager at Speech Plus, Inc. of Mountain View, Calif., "if you do a good job, it will sound more human than text-to-speech."

Because voice synthesis products are not constrained to only those words that have been recorded and digitized, they may overcome the major drawback to voice response: its inability to transform any text into voice.

Huge amounts of storage space are needed to digitize speech for use in a voice response system, making large vocabularies impractical. "Voice response is usable and practical for only limited applications, such as those with a small fixed vocabulary and no need for free-form text," said Walt Tetschner. Tetschner is senior engineering manager at Digital Equipment Corp. and headed the team that developed Dectalk, a voice synthesis peripheral.

Tetschner pointed out that because on-line help requires large amounts of text, it would be close to impossible to add this feature to a voice response system. With voice synthesis products, it's a different story.

Text-to-speech products, which can take the form of either a peripheral, an add-on board or a single chip, operate in three basic steps. The first step converts Ascii characters into phonemes, the basic sound elements of the language. A synthesis system uses between 40 and 70 phonemes.

"Converting text into basic phonemes is like converting one language into another," Tetschner said. "It is done by rule and dictionary. A rule, for example, designates the sound of the *f* phoneme in *father*, *fig* and *five*. An exception to the rule, like the word *of* is put in the dictionary." Abbreviations, numbers and symbols are also put in the dictionary. A user-defined dictionary can contain names and other mispronounced words.

"There is no secret to converting text into phonemes," said Tetschner. "It is a rigorous conversion, like translating one language into another. If you piece together the basic phonemes, they would sound like hell."

"The next step in voice processing, prosodics, is where the qualities that make a voice human, such as inflection, tone and stress, are addressed," he added. "This is where the magic is."

Dennis Klatt, senior research scientist at MIT, licensed his inventions to both Speech Plus, and DEC. Klatt has specialized in prosodics for many of his 20 years of research in synthesis. The early problem with speech synthesizers, he recalled, was their lack of intelligibility.

Klatt eliminated this obstacle by first studying the details of language, including new theories from linguistics, before making changes in the way speech is synthesized. Klatt's technology has enabled Speech Plus and DEC to manufacture highly intelligible synthesizers.

The pressing question is whether users in the office can be convinced that they need voice synthesis products; the question for the future is how soon the technological problems facing voice recognition will be solved.

In fact, in a test of word recognition, subjects were able to identify 96.7% of the words spoken by Dectalk and 88% from Speech Plus.

The last step of text-to-speech synthesis is the actual formation of speech waveforms from electronic signals. Dectalk is unusual in that it has seven voices, each modeled after a real person. Initially designed to give speech handicapped people an appropriate voice, the variety gives office users the ability to audio highlight information, such as distinguishing commands from text.

According to Klatt, "There will be no more dramatic technological improvements in synthesis." Speech Plus' Gilblom said, "The technology is good enough to deliver the information, but there are still some shortcomings. At this point, the products are good enough to be useful at most applications."

Some disagreement exists, however, about the state of the technology. Stephen Hopkins is a voice products specialist at Wang, which has licensed Speech Plus' technology, but has yet to produce a product. "Until you have a product that sounds natural, you have a problem," Hopkins said, and text-to-speech still sounds computerized. "The technology has improved, but it's still not totally natural," he added.

An IBM spokesman said it is important for the user to know whether he is dealing with a person or machine. "We don't want to deceive people." Text-to-speech synthesis is a long way from producing an output that could be mistaken for human voice. Nevertheless, now that the work of Klatt and others has reduced intelligibility to the level of a minor irritation, most industry watchers agree the major problem is finding a fertile market for the technology.

The lack of immediate office applications will nag synthesis for the next few years and has put a damper on recent technological advances in the field. Remote retrieval of information, mainly electronic mail, will be the most common application of text-to-speech synthesis, at least for the next few years. According to Tetschner, Dectalk and products like it "will act as a bridge between text mail and electronic mail." An executive on the road can access his mail at any time of the day or night, via a text-to-speech product and a push-button phone.

Analysts, however, generally discount the applicability of synthesis products. "Synthesis is primarily a promo," said John A. Murphy, vice-president of Advanced Office Concepts, a consulting firm in Bala Cynwyd, Pa. "In the office, the application of voice output is basically nil. As a mail retrieval system, why not go to voice mail?"

John Hoper, vice-president of peripherals at Future Computing, Inc. in Richardson, Texas, said "There is no broad pervasive need for synthesis." He called remote retrieval "a very good technology, but in a niche market."

Not all analysts agree. David Terrie, senior analyst for the Boston-based Yankee Group, said, "I like the Dectalk idea. It has real applications in sending messages. He was pessimistic, however, about the "true utility" of a talking computer and added, "There is already enough noise in the workstation environment."

Other office applications for synthesis include voice annotation (the addition of a voice message to written information) and training, where audio prompts may make it easier for people to learn. According to an IBM spokesman, voice synthesis offers an additional channel of output and is especially useful for users who are overloaded with information on the screen. An audible warning is more apt to be responded to than one that sits on a screen, he said.

If the major technological problems for voice synthesis have been solved, many of those facing voice recognition are only now being defined. To produce a machine that will recognize an unlimited number of words and voices, we need a more complete understanding of human speech patterns.

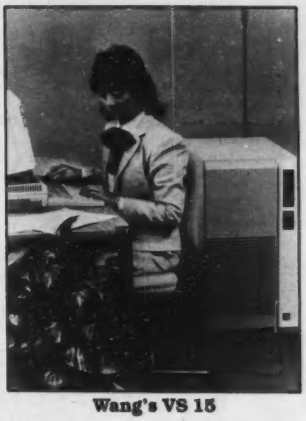
"When two people say the same word, we need to know what is variable and what is constant," Klatt said. Without this knowledge, it is impossible to program a computer to pay attention to only what is constant — and therefore significant — in human speech.

When the problems with recognition have been solved, marketing will be no chore. But most products on the market currently limit vocabulary to a few hundred words and require the user to speak deliberately and pause be-

NATICK, Mass. — **Prime Computer, Inc.** introduced two 32-bit 50 series processors — the 9750 and 9650 — which effectively replace the company's Model 750 and Model 550-II processors. The 9750 reportedly provides 75% greater internal throughput than the 750 at a 12% to 15% higher price. The 9650 is said to outperform the 550-II by 30% and costs 12% more.

The 9750 is positioned to compete against the Data General Corp. MV/10000, the Digital Equipment Corp. VAX-11/785, the Hewlett Packard Co. HP3000 Model 68, the IBM 4381 Model 1 and the Wang Laboratories, Inc. VS 300. A 4M-byte 9750 configured with two 315M-byte disk units, a streaming tape module, CRT console and Primos operating system costs $251,500.

The 9650 compares roughly to the DG MV/8000 Model 2, DEC's VAX-11/780, HP's HP3000 Model 48, IBM's 4361 Model 5 and Wang's VS 100, the company said. The 9650, similarly configured as the 9750 above with a 2M-byte processor is priced at $146,500 from Prime, Prime Park, Natick, Mass. 01760.



Wang's VS 15

LOWELL, Mass. — **Wang Laboratories, Inc.** unveiled an entry-level system for small offices. The VS 15 provides up to 1M byte of main memory, support for up to 10 users and remote diagnostics. The system supports Wang Systems Networking products for linking Wang systems and providing gateways to other vendors; Wang WP Plus and VS/IIS word processing; VS Multistation windowing; graphics facilities; and Pace, Wang's relational data base management system.

The VS15 basic system, consisting of a central processor with 256K bytes of main memory, one internal 5.25-in. 33M-byte fixed disk drive and a 5.25-in. 360K-byte diskette drive, costs $13,500 from Wang Laboratories, Inc., One Industrial Ave., Lowell, Mass. 01851.

SOUTHBORO, Mass. — An office software system that reportedly combines the advantages of integrated PC applications with the information-sharing benefits of communications-based OA systems was introduced by **Applix, Inc.**

Alis, running on the Unix operating system, is targeted for resale by large OEMs and makes use of computer intelligence, communications facilities for group support, multiwindow user interface and portable, open-system design.

Alis reportedly enables users to combine text, drawings, graphics, spreadsheets and data base information into a single document. The product also integrates electronic mail and personal data bases. Alis, priced at $1,350 per user for bit-mapped workstations, and $900 for terminal-based users, will be available to OEMs in November from Applix, Inc., 302 Turnpike Road, Southboro, Mass., 01772.

OCEANPORT, N.J. — **Perkin-Elmer Corp.** announced that its Everyware series of computers will support the Unify relational data base manager software from Unify Corp. The Unify product will run on Perkin-Elmer's recently introduced Unix V-based Xelos operating system.

The Unify system provides full service to multiple users, according to the vendor, and features full screen interaction; two dimensional development tools; menu-oriented operational interfaces; and nonprocedural query, report writing and updating facilities.

Unify licenses are priced at $750 for the 7350 Professional Computer and $1,495 for the supermini 3205; they are scheduled for the fourth quarter from Perkin-Elmer Corp., Data Systems Group, 2 Crescent Place, Oceanport, N.J. 07757.

ALBUQUERQUE, N.M. — **MAI/Basic Four Business Products Corp.** introduced an integrated accounting software package for the IBM PC and compatible systems.

Aimed at the novice user, the software features 11 application modules and requires 128K of memory.

Each module costs between $395 and $595, from MAI/Basic Four Business Products Corp., 601 San Pedro N.E., Albuquerque, N.M. 87108.

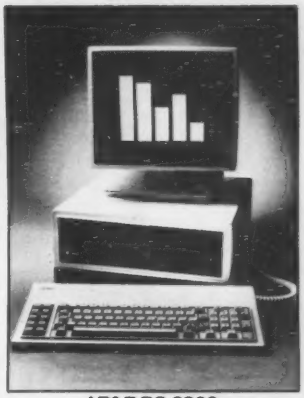
MORRISTOWN, N.J. — **AT&T Information Systems** has introduced its first personal computer, along with a local-area network offering.

The PC 6300, said to be compatible with but faster than the IBM PC, is a 16-bit computer built by Italy's Ing. C. Olivetti & Co. The product is based on Intel Corp.'s 8086 microprocessor and runs MS-DOS. Through AT&T's PC Interface, announced in March, it can also act as one of up to 18 workstations in a network with the Unix-based 3B line of superminicomputers.

AT&T will market the PC 6300 through direct sales to large customers, OEM/VAR channels and computer retailers such as Computerland, Sears Business System Centers, Microage, the Genra Group, Compushop and AmeriSource.

The PC 6300 is available with 128K bytes of random-access memory (RAM), MS-DOS and dual 360K-byte floppy disk drives for $2,810; and 256K bytes of RAM, MS-DOS, one floppy disk drive, and one 10M-byte hard disk drive for $4,985. Both versions can be upgraded to 640K of RAM.

AT&T announced that a number of **Digital Research, Inc.** software packages, including a Concurrent PC-DOS operating system; Graphics Systems Extension software; DR Graph ($195); DR Draw ($295); and programming languages such as PL/I ($750), Digital Research C ($350), CBasic ($600) and Pascal/MT ($600) will be available for the AT&T Personal Computer. AT&T said that it expects Concurrent PC-DOS to be available in the fourth quarter.



AT&T PC 6300

AT&T also announced its Information Systems Network (ISN), a local-area network that reportedly combines fiber optics and existing standard copper wire, a number of software packages for the 3B and Personal Computers — including word processing and spreadsheet programs and six new printers.

ISN supports data at speeds of up to 8.64M bit/sec; offers a multiplexed fiber interface for selected host computers; and is said to complement AT&T systems such as System 75, 85 and the Dimension PBX family. For more information, contact AT&T Information Systems, 100 Southgate Parkway, Morristown, N.J. 07960.

(Continued from Page 52)

tween words. As a result, users are not exactly running over each other to get first crack at the vendors.

"People don't naturally think of voice recognition solutions to office problems," said Randi Martin, manager of Marketing Communications for Threshold Technology, Inc., a voice recognition manufacturer in Delran, N.J. For now, the limitations narrow users to executives who suffer from keyboard fright, offices that depend heavily on data entry or users of applications that require a person to keep his hands free.

The recognition market is a volatile one, dominated by small companies. "Some products have a nice but not spectacular ability to allow you to speak to a spreadsheet, but you have to pause between words and spell out the numbers," Murphy said.

"The technology is still primitive," he added, but said that as soon as it is perfected, its impact will be revolutionary.

Many experts agree that voice-activated typewriters — machines that will transform unlimited speech into text — will arrive within 10 to 15 years. IBM, which for 12 years has had a research group working on recognition, currently has an experimental product that will recognize 5,000 separately input words, according to a company spokesman.

Though the two technologies — synthesis and recognition — have developed independently, "an improvement in one can always help the other," Wang's Hopkins said. Until voice recognition catches up with voice synthesis, the talking computer that cannot listen is just not that attractive. For general office applications, voice must be a two-way interface; as a one-way proposition, it has only limited appeal.

Although voice is sometimes clearly superior to the keyboard, as an output, it does not necessarily have an edge over print. For users who have access to a display screen, for example, and in instances where the output is a chart or table, voice alone is not the answer.

The ultimate voice technology product, according to some analysts, will have artificial intelligence, enabling it to carry on a free-form conversation. It will be able to rephrase audio input from the user and condense data from the computer, picking out crucial bits of information and spitting them back as requested.

A major obstacle to the success of voice technology, both synthesis and recognition, remains user acceptance. "Voice has to meld into the office," said Larry Drinkwater, voice products manager at Wang. "The normal flow of business cannot be disrupted. The technology is very good now, but without user acceptance, it will fail."

Cogen is an editorial intern at Computerworld OA *and a freelance writer.*

TECHNOLOGY

PALO ALTO, Calif. — **Xerox Corp.** announced enhancements to the Ethernet local-area network which reportedly allow users to access IBM Personal Computers and Digital Equipment Corp. computers.

Using Systems Network Architecture, the IBM PC can reportedly be linked to more than 20 Xerox office products now operating on Ethernet. Xerox also announced a remote batch computer service on Ethernet for document interchange among computer systems from various vendors.

The service supports IBM 2770, 2780 and 3780 communications protocols and allows users to send data created on IBM mainframes to Xerox networks.

The kit to put an IBM Personal Computer on Ethernet is scheduled for the fourth quarter for $795.

Other software features such as DEC VT-100 emulation and remote batch service will reportedly be available in November and will cost from $200 to $1,500 from Xerox Corp., Office Systems Division, 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

WESTBORO, Mass. — **Data General Corp.** unveiled software and hardware enhancements to its Desktop Generation family of microcomputers, a decision support package for its CEO Comprehensive Electronic Office and a color workstation.

The Desktop Generation system can now support 16 terminals, up to two new hard disks providing 38.6M bytes of storage each and a new 132-col dot matrix printer.

The CEO Decision Base, which consists of a personal data base, spreadsheet tool, report writer and charting tool, runs on the entire line of Eclipse MV/Family systems and Desktop Generation models. The Dasher D470C is an ergonomically designed color alphanumeric display terminal aimed at decision support, word processing and color graphics applications.

The multiple terminal multiplexors, allowing up to 16 users on Desktop Generation Model 20 and Model 30, cost $1,050. The 38.6M-byte hard disk costs $5,745.

The 132-col multifunction printer costs $1,595; a 180-char/sec version is priced at $2,995. The initial license for the CEO Decision Base is $8,500 when supported by the AOS/VS operating system, $6,000 when supported by AOS and $500 when supported by AOS/Workstation. The Dasher D470C costs $2,995.

DG also introduced a low-end 32-bit minicomputer, a project planning system for CEO users, a relational DBMS for the Eclipse MV/family systems, a "near-letter-quality" printer and a high-end disk and tape subsystem. The Eclipse MV/4000 SC, part of the MV/Family, is base priced at $34,800.

For more product information and prices, contact Data General Corp., 4400 Computer Drive, Westboro, Mass. 01581.

MAYNARD, Mass. — **Digital Equipment Corp.** unveiled a new top-of-the-line micro, the Micro PDP-11/73, with a performance level reportedly that of a mid-range mini.

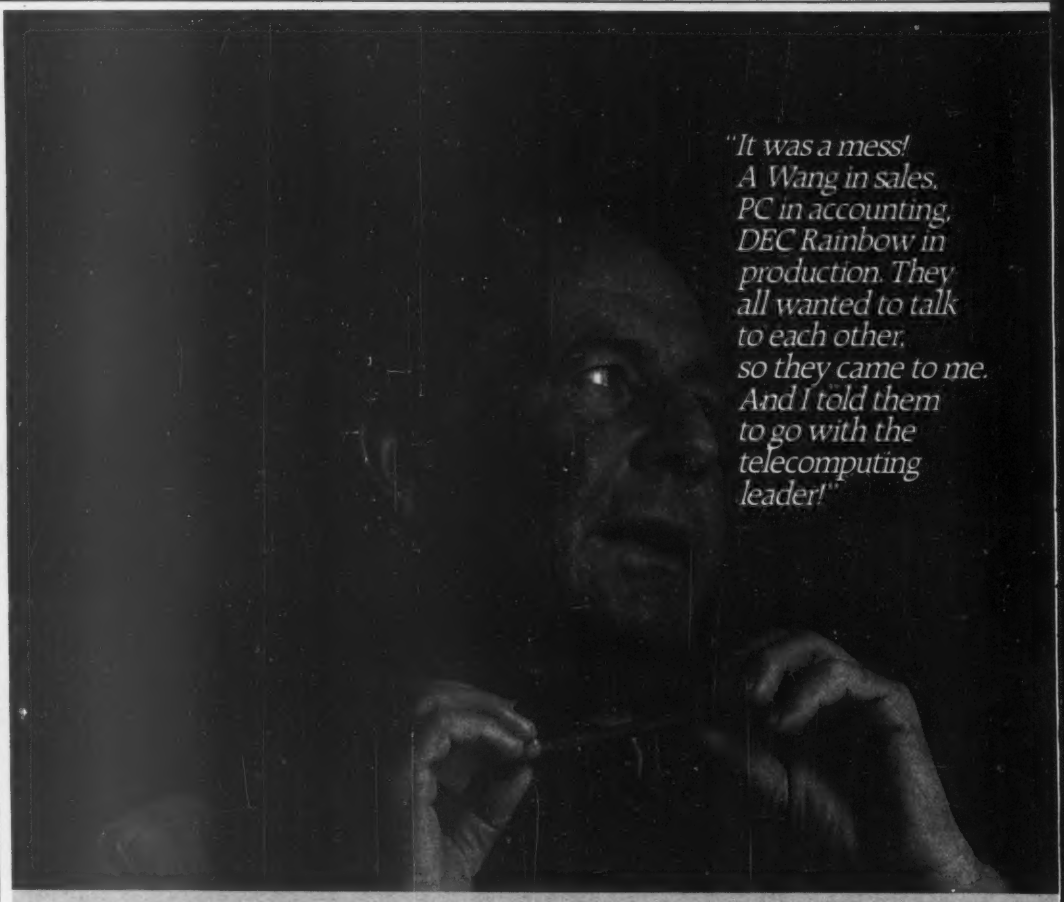
The second member of the Micro PDP-11 family, the Micro PDP-11/73 incorporates DEC's J-11 microprocessor chip set and is targeted for both end users and original equipment manufacturers.

The Micro PDP-11/73 system is priced from $7,800 in a rack-mount version from Digital Equipment Corp., Maynard, Mass. 01754.

BOULDER, Colo. — **NBI, Inc.** introduced its U! Technical Workstation, a Unix-based desktop computer for technical professionals. The company also unveiled a series of IBM-compatible micros and a new word processing system.

The U! Technical Workstation reportedly allows users direct access to Berkeley 4.2 version of Unix, features 1M byte of memory and is available for $15,495.

The Oasys 4100S and 4100X microcomputers can be used as stand-alones as well as sharing data and peri-



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When it comes to communicating—computer to computer—Hayes says it best. Our telecomputing systems make life easier for your managers who want to communicate via computer. And that, in itself, makes life easier for you.

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More connection capabilities. Our new Smartcom II is available for more than 16 personal computers (with more to come)! Now the HP 150 in purchasing can swap data with the Wang in accounting. While the COMPAQ® in sales gets updates from the TI in the southeastern office. Quickly and easily. Smartcom to Smartcom. And with no handholding from you.

XMODEM protocol. In addition to the Hayes Verification protocol, Smartcom II includes the XMODEM protocol, for error-free transmission to even more micros, as well as to mainframes at the information services.

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Voice to data communications. With Smartcom II, users can easily switch from voice to data transmission (and back again), all in the same phone call. This saves both time and money.

pherals with NBI's other workstations and IBM PCs when connected to a NBI Oasys 64 cluster controller. The 4100S with one 5¼-in. floppy disk drive and 128K of random-access memory (RAM) costs $2,725; the product with dual disk drives and 320K RAM costs $3,625. The 4100X comes with one disk drive and 10M bytes of hard disk storage, 320K RAM and is priced at $5,475.

The Oasys 4000SC word processing system can be used as a stand-alone or clustered with NBI equipment and costs $4,995 with a single disk drive, and $5,795 with dual disk drives. For more information, contact NBI, Inc., P.O. Box 9001, Boulder Colo. 80301.

HOUSTON — Four IBM-compatible desktop microcomputers, based on Intel Corp.'s 8086 microprocessor, were unveiled by **Compaq Computer Corp.** The company said the Deskpro line runs without modification all the popular software developed for the IBM PC and PC/XT, but two to three times faster.

The 16-bit computers run the MS-DOS operating system and feature a 12-in. dual-mode monitor allowing the user to run both high-resolution text and graphics programs on the same screen. The base version, including 128K bytes of random-access memory (RAM) and one 360K-byte disk drive, is priced at $2,495.

Model 2 comes with 256K bytes of RAM and two 360K-byte floppy disk drives for $2,995. Model 3, with 256K bytes of RAM, one 369K-byte floppy disk drive, a 10M-byte hard disk drive and an asynchronous communications interface, costs $4,995. Model 4 comes with 640K bytes of RAM and a 10M-byte fixed disk drive backup as well as those features on Model 3 and costs $7,195.

Compaq also announced 256K-byte RAM upgrades for the Compaq portable and Compaq Plus Personal Computers.

The $650, 256K-byte chip enables users to expand RAM on the system board, saving an expansion slot for IBM PC-compatible peripherals, from Compaq Computer Corp., 20333 FM149, Houston, Texas 77070.

SAN ANTONIO, Texas — **Datapoint Corp.** announced an applications processor, a low-cost terminal, a color professional computer, a windowing technique and a fiber-optic link for its ProVista office automation system.

The Vista-Station-84 application processor, incorporating the Intel 16-bit 80286 microprocessor, is designed to perform such tasks as word processing, electronic mail, financial modeling and windowing within an ARC local-area network.

The Vista-Station-82 terminal operates in conjunction with the Vista-Station-84 in a dual workstation configuration.

The Vista-PC color computer supports MS-DOS and can be configured in clusters. The Vista-View windowing technique can be used on both Vista-Station products. The fiber-optic link increases the maximum distance between hubs in a network from 2,000 to 4,000 feet.

Prices are as follows: Vista-Station-84, $8,550; Vista-Station-82, $2,295; Vista-PC, $4,795; Vista-View license fee, $1,000.

For more information, contact Datapoint Corp., 9725 Datapoint Drive, San Antonio, Texas 78284.

SANTA CLARA, Calif. — **Ungermann-Bass, Inc.** introduced a network interface controller enabling users to connect IBM Personal Computers and certain IBM PC-compatibles to its Net/One local-area network.

The Personal NIC, a plug-in board based on the Intel 80186 microprocessor, supports standard Ethernet, 10M bit/sec thin-coax baseband, 5M bit/sec broadband or 10M bit/sec fiber-optic cable, reportedly permits the use of all Net/One and Personal Connection software.

It costs $595, from Ungermann-Bass, Inc., 2560 Mission College Blvd., Santa Clara, Calif. 95050. OA

Unattended operation. Smartcom II can receive messages on disk or hard copy, completely unattended. It also lets users "batch" up to 25 communication sequences, and will automatically transmit them later. This convenient feature can cut long-distance costs considerably, since data can be sent when phone rates are lowest.

Follow the leader! If you're involved with linking micros or setting standards for configurations, let Hayes provide the definitive connection. With feature-rich, direct-connect modems. Easy-to-use, menu-driven software. Concise documentation. Extensive customer service. *And* unsurpassed reliability.

Get control of your communications! With a telecomputing system solution, from the telecomputing leader. Hayes.

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• Hayes Verification and XMODEM protocols • Records and executes up to 25 communication sequences for unattended transmission • Emulates DEC VT100 and VT52 terminals • Prints data while recording on disk • Stores telephone numbers and communication parameters • Defines and stores log-on sequences and 25 remote system commands • 128K memory • Voice/data communications.

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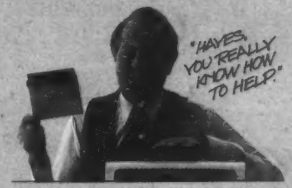
For additional information see your Hayes authorized dealer or call us direct.
Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, Georgia 30092. 404/441-1617.



Hayes

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CALENDAR

Aug. 19-25, Brookline, Mass. — **CEO Roundtables for Small Firms.** Also, Sept. 23-30, Martha's Vineyard, Mass. Contact: Professional Services Management Journal, 126 Harvard St., Brookline, Mass. 02146.

Aug. 20-22, New York — **Building A Data Communications Network.** Contact: Bobbi L. Brickman, WDP, Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Aug. 21-23, San Francisco — **Introduction to Telecommunications.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Aug. 22-24, Hartford, Conn. — **Office Automation and the Technology Revolution.** Also, Aug. 27-29, Princeton, N.J.; Sept. 5-7, San Jose; and Sept. 12-14, Columbus, Ohio. Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110.

Aug. 22-24, Boston — **Data Management and Fourth-Generation Languages — Relational Data Bases by C.J. Date.** Also, Aug. 27-29, Toronto and Oct. 10-12, New York. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Aug. 27, New York — **Introduction to Local-Area Networks.** Contact: Bobbi L. Brickman, WDP, Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Aug. 27-28, Boston — **Data Communications II — Digital Communications Systems.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Aug. 27-28, Los Angeles — **Data Management and Fourth-Generation Languages — Information Centers.** Also, Sept. 11-12 and Sept. 24-25, Atlanta. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Sept. 11-14, Palo Alto — **Knowledge-Based Systems, Artificial Intelligence and Fifth-Generation Computing.** Also, Sept. 18-21 and Oct. 2-5. Contact: Nora Swerdloff, Integrated Computer Systems, 6305 Arizona Place, P.O. Box 45405, Los Angeles, Calif. 90045.

Sept. 11-14, San Diego — **Computer Graphics — Short Course.** Also, Sept. 18-21, Washington, D.C. and Oct. 2-5, Long Island, N.Y. Contact: Ruth Dordick, Integrated Computer Systems, 6305 Arizona Place, Los Angeles, Calif 90045.

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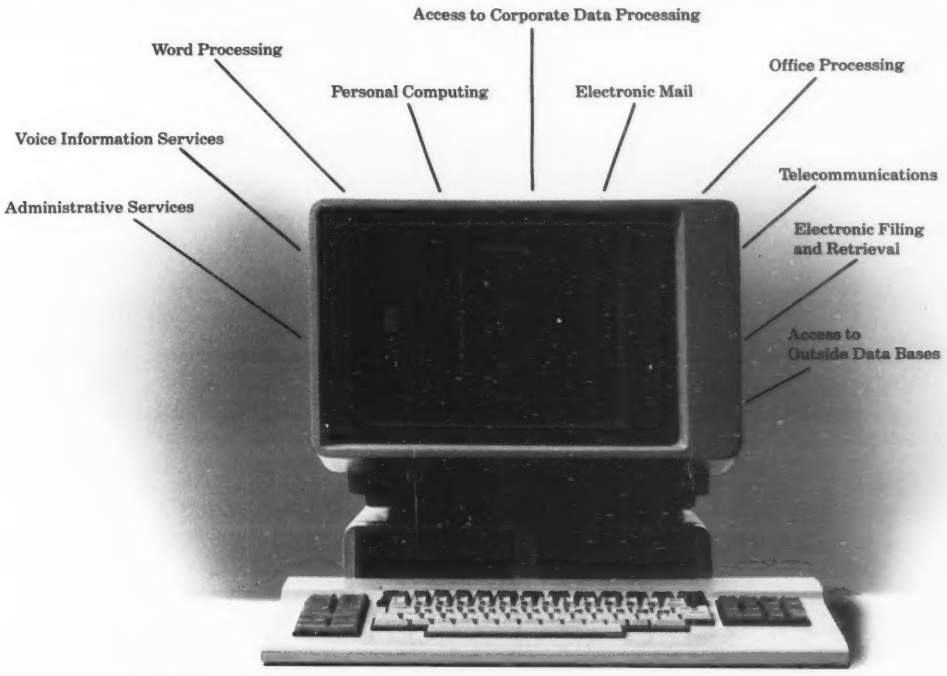

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